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The American Electroplaters' Society

The American Electroplaters' Society, since its inception, has weathered many a storm including war and depression. It has come through not only unshaken, but indeed greatly strengthened, because the idea on which it was founded was, and is, good.

Certainly, the A. E. S. holds a place in the front rank of those institutions which have contributed to the advancement of the science of electroplating.

Today, we stand firmly on a foundation of 30 years building, yet we stand in a critical position. Almost overnight, electroplating has been curtailed to the point of extinction in many shops. Platers have been drafted into the armed forces and into other industries.

The task ahead of the Branches will be to sustain their membership in the face of the certain loss of interest which will follow this disruption of industry.

New methods and materials will be substituted for the finishes perfected through the past years. To carry on the work which justifies its being, the dissemination of knowledge, the A. E. S. must keep its members informed of these new developments in metal finishing and coatings of all types.

It was amply demonstrated at Grand Rapids that although the delegates were not averse to welcoming new processes and new finishes into our educational sessions, they are extremely jealous of the prestige our society has gained under the name of the American Electroplaters' Society. We stand for the constant progress of the A. E. S. and its service to its members in whatever form it may take.

Too rapid progress however, without substantial constructive criticism, might well be construed to mean a lack of sound deliberation on the part of the membership. It is characteristic of the A. E. S. that all progressive movements in the past have been carefully thought out. Consequently, there have been no serious errors in judgment.

The best way to get a good job done quickly, is to go after it whole heartedly. We have, therefore, appointed Ellsworth Candee, Geo. Wagner, and Clarence Helmle as a committee to study the problem of how best to welcome the new into our society without seriously affecting the old.

This committee must have your support to do their job. Your individual and branch views on this problem will be their guide.

We hope your response will be hearty and prompt.

CHAS. C. CONLEY, *President.*

Address: We Must Win the War, But How?

By DR. ALFRED P. HAAKE,
Managing Director, National Assn. of Furniture Manufacturers, Chicago, Illinois before the 30th Annual Convention, American Electroplaters Society, held at Grand Rapids, Michigan, June, 9, 1942.

I need not say to you men that I get a great variety of introductions because I speak a good deal and I am also frank to say to you that that is a perfectly fresh type of introduction which I thoroughly enjoy! . . . I appreciate it very much.

I suppose the principal difficulty that we face, the thing that deters most of us in adopting policies in one direction or another, is the fact of uncertainty. If we could just know, *just know what is coming and when*, the problems that we confront would be so much more simple . . . which reminds me at the outset, if I may indulge in a little story, of how uncertainty affected a gentleman in Columbus, Ohio. This man ran to the police station one day and said to the captain, "For goodness sake, lock me up—my life is in danger!" The captain said, "Why, what is the matter with you?"

He said, "My life is in danger—a man has threatened to shoot me!"

"Well, tell me about it."

"I got a letter this morning—the man says if I don't stop calling up his wife, he is going to shoot me and—"

The captain said, "That's simple enough,—stop calling up his wife."

He said, "Yes, but the darned fool didn't sign his name!" (laughter).

And I suppose under those conditions a man might feel reasonably uncertain as to just what to do and that is the condition that we find ourselves in with respect to the war and what is coming after the war.

One is asked sometimes, "How long is the war going to last?" Well, your guess is as good as mine. Nobody knows. Mr. Hitler may or may not do certain things in that line, Hirohito may do some things and even the little squirt over in Italy may come back into the picture in one way or another . . . A lot of things can happen over which we have no control whatsoever,

so it is not possible to say definitely how long it is going to last, except that it is going to last too long, no matter how long it lasts.

Of one thing we can be sure and that is that we have got to win this war. There was a time when among us there were people called pacifists and isolationists and they were perfectly within their rights. I happen to have been on the other side of the fence . . . in fact, last September I appeared on a radio program opposed to the isolationist attitude and yet while I opposed it, I maintained they had a perfect right to their position so long as we were not actually committed in one way or another. Any time they lose that right, this ceases to be a free country. Our job is to make up our minds a little bit quicker, but until our minds were made up, they had a perfect right to speak their piece, even though I am one of those that thought their piece was not the right tune.

Now there are no pacifists, no interventionists, no isolationists, we are all just Americans, with one job on our hands—to win this war, as completely, decisively, and quickly as possible. We have got to win it, I think for a reason a lot of people don't appreciate. We talk about the danger of Hitler and Hitlerism . . . it is far more great than most people appreciate. Our shores are not as safe as some folks thought they were. The influence of an undefeated enemy can be far more serious than we have any idea.

I will put it in a sentence just this way: Unless we win this war, decisively and completely and by that I mean the complete and total destruction of Germany and Japan as military powers, because Italy is out of the picture already, the complete destruction of those two,—unless that happens, we shall have totalitarianism not only in the rest of the world, but also right here at home.

The fate of democracy is literally at stake and we have to win or civilization moves back several hundreds of years. Well, that is easy enough to say, but how shall we win? We are not going to win just by dint of patriotic speeches or waving the flag or patting ourselves on the back and telling us how good we are.

I remember talking with a distinguished naval officer prior to Pearl Harbor—indeed, as far back as July, 1940, when I was credibly informed in Washington that we were already com-

mitted to war and it was only a question of bringing the public opinion along far enough so that necessary steps be taken. I asked this question, "What chance is there of winning against Japan?"—he laughed and said, "Why, if Japan sticks her head up too far, we will just go over there some Wednesday afternoon and clean her up!" And there were others who thought it might possibly last as long as a couple of weeks, but we didn't take Japan seriously—we didn't think there was any great danger of Germany coming over here and causing any difficulties and with that complacency, which even Pearl Harbor did not entirely destroy, our war effort has been slowed up a good deal. We should have been a year further along by this time and could have been if the people of the United States had been somewhat less smug and complacent than we were prior to Pearl Harbor. We aren't going to win by patting ourselves on the back, and we aren't going to win by squirting dollars at anybody.

Now and then I have read, as you have read, of new appropriations which now—I don't know, I have lost count—total goodness knows how many billions of dollars, but the total we now have reason to believe, will go close to $300,000,000,000. Now and then you have heard someone say, "By gosh, we are going to lick them—look at the appropriations—there was never a nation in the world that passed so many appropriations, we are sure to lick those guys."

Well, you cannot lick the Japs by squirting dollars at them. Even $10 bills won't do the job, and you cannot lick Hitler passing appropriations. Passing appropriations means exactly nothing, until the money is translated into goods with which to win the war. It takes two things to win that war; one of them is to fight—and our boys are making a rather decent record for themselves on that score—they will do even better before it is over—and the others, the thing that all the rest of us have to do, is to work. There is no other way of winning this war. Either fight or work and if I had the privilege of being in charge of things, I think I should make it clear to every citizen of the United States, "Take your choice—it does not matter much which—take your choice, but either fight or work; if you don't do either of those two, we may find some accommodations for you, in the meantime, that will at least keep you out of mischief . . . Fight or work,—that is the place to begin!"

All right, we are beginning to do it . . . we got a late start . . . it is perfectly true that when we started out, a lot of people thought more of social gains and they thought of the gains of labor and they thought more of keeping their businesses intact, they thought more of a lot of other things in which they were personally interested, than they did of winning the war.

Labor was perfectly willing to see us win the war, provided only that we didn't take away the 40-hour law, that we didn't stop the process of unionizing all industry, and labor has not yet been willing to give that up.

Industry would like to keep going, do business more or less as usual. I won't say this is thoroughly typical, but I have had men come into my office and say, "Doc, what can I do to help win the war? I will do anything, provided it does not interfere too much with my business."

And so there were the other groups, perfectly willing for the other fellow to make the sacrifices, and the first thing that every last one of us has got to realize, if he has not done it yet, is that there is one thing that comes first, and that is winning the war; nothing can come ahead of that. If winning the war meant smashing every trade association, we would smash them; if it meant smashing every labor union, we would have to smash them; if it meant smashing any other kind of organization, if that were necessary to win the war, we would do it because winning the war comes first.

It takes goods to win this war. I have indicated either work or fight, but I have not answered the question yet. The question is, "How can we get the goods?" let's look at a few figures: At first we did not do a good job; we are doing a much better job now—a surprisingly good job, but look at the figures for a moment—we have got in this country about 50,000,000 employable persons. There may be more because we are going to wreck some school systems, as has happened in Milan, Tennessee where the school system is going to work loading shells. The employees of the schools can make more money doing that than they can as teachers or even as principals, so they are going into that kind of work, and that is all right. But when you add that all up, it comes to about 50,000,000 workers.

Frank Knox came down to Chicago not long ago, pointed out we would have to have about 18 workers behind the line for

every fighting man. I think Mr. Knox's figure may have been a little bit large—the estimates run anywhere from 10 to 18—they average about 14—I am going to use the figure 10, the low figure, so that I am sure to be fully as conservative as I should be.

All right, we will have 3,000,000 fighting men—we have got pretty close to it right now. If you take 10 workers for everyone of those fighters, that adds another 30,000,000. That means 33,000,000, and then you have to add to that all the government employes, and add it quick, because the number changes from day to day—and now you have 35,000,000 workers for the war effort alone, and that is a conservative figure.

When you substract that 35 from 50 million, you have about 15 million of workers left who are available for plating silverware and door knobs and other kinds of knobs made of wood or otherwise, and all the activities that are necessary—15 million of them. Normally to support our regular standard of living requires about 45 millions of workers and that means that if they work at the same rate that they have been, we are going to have to cut our standard of living by about two-thirds in order to carry on the necessary war effort.

That means that where you now had three pairs of shoes, you will get one. We might even take away two gallons of gas out of the three he (referring to Mr. Candee's mention of gas rationing in the east)—although he gets a bit more than that—and if you have three loaves of bread, you will only have one left.

Well, the answer to that is, "The people won't stand for it." . . . That reminds me of the fox farm north of Milwaukee, Wisconsin . . . A sweet little lady going through that farm said to the man, "Is that where the furs come from, the fox furs, right off the foxes?"

The man said, "Yes, madam; we take the furs right off the foxes."

She said, "Dear me—that's interesting! And how many furs do you take off a fox?"

"Well," the man said, "We usually take one, sometimes two, but by the time we get to the third one, the fox begins to resent it." (laughter)

And I have an idea that sometime before we got the public

down to one-third of their normal standard of living, they would begin to resent it somewhat.

If it is true as we have been told, that one-third of the population was underfed, ill-clad, etc., why, a reduction of two-thirds of our standard of living would kill off half the population and they certainly would resent it. So there is your immediate problem. It takes manpower to produce and you have to have the goods or you are licked. You cannot sink Japanese ships unless you have the bombers and the bombs to drop on them, plenty of them, and it was only after they had piled up a nice reserve in England that they went over and caused a sweet smell and pleasant commotion in Cologne, Essen and one or two other places. It is going to take plenty.

It takes six barrels of gasoline to fly a bomber across—25,000 barrels of gasoline to make one of those bombing trips—that's why you birds don't get any gas on the Atlantic Coast and before we are through, the rest of us are going to be hiking back and forth from the front porch to the back porch. We have got to produce the goods and the manpower just isn't there.

Those of us who were for the doing away with the 40-hour law were not trying to reduce labor to slavery—that is sheer nonsense—there was not any such idea. We saw the spectacle of France, which chose between its labor gains and the life of the country—they chose for the labor gains and they lost their nation. Up to the moment that the Germans came in, they still were operating on that basis . . . they committed suicide because they thought short hours were more important than saving their nation.

I started talking a couple of years ago—but I talked in the wilderness—telling people that five days of work a week was not enough, that they had to work six and if six were not enough, they would have to work seven, but that was the time to get the stuff out and have it ready was before the guy came after you. He came after us and we were not ready. We have not lost yet and we are not going to lose, but the time is short and the issue is by no means determined.

Forty hours a week just aren't enough . . . men have to produce more. Well, the men aren't there. Then what is the answer? Put the women and babies to work? We put some of the women to work . . . we will learn some things . . . maybe

after the war is over a lot of women will stay at work, because they will show up some of the men whose places they took, but the answer is perfectly simple—all we have to do is recognize it and apply it.

Of course, you cannot expect a politician to recognize it—not in a government that is controlled by labor leaders and we do have a labor government in the United States. That's not one of the things that it is popular to say, but it happens to be true—the labor leaders write the ticket. The fellows down in Washington, even after thousands and thousands of letters from all over the country demanding that they get busy, listen to the labor leaders rather than to the country . . . They don't do it entirely, but believe you me, they have big ears when the boys begin talking to them.

Let me give you an example . . . Not many miles from this very town, a young man went to work turning out cam shafts on a metal lathe . . . He had not gone to work before; they put him through the training course, he had heard a speech by President Roosevelt—a dandy speech— the day before, telling him how important it was that we all get busy in all-out effort. This fellow went to work fairly quivering with the importance of the job he had to do and when he got through that day, he had turned out 12 shafts, shafts to be used in government machinery to produce arms and one thing or another. As he walked out of the plant that night two men came up to him, tapped him on the shoulder and said, "What do you mean by what you did today?"—only adding something to it to make it more emphatic.

Can you imagine the young fellow apologizing, saying, "This is only my first day, I have had only the training course, I have not had any experience yet, but I will do my best and bye and bye get it up to 15, 20 a day," And the answer came, "Hell, you're producing too many now!" By the end of the week they had him down to eight, which is the most that any worker in that plant is permitted to produce. The green man could produce 12; the most that they allow men to produce is eight. You can call that an all-out effort, if you like, call it patriotism, anything else—to me that is plain, ordinary, simple sabotage—sabotaging one-third of the output! (applause)

Come with me down to Toledo . . . A young fellow almost

with tears in his eyes, said to the man to whom he talked, "God, I would like to do more . . . at the end of 40 minutes of each hour, I have to shut down my machine and the machine and I loaf for 20 minutes, because I am not allowed to do any more work for the rest of the hour."

In Detroit, an article in the official CIO paper warned the men not to produce too much; and in Flint, Michigan, the CIO Union actually passed a resolution saying they would not increase their output until everybody was employed. Well, there are a lot of people who never will be employed, they are unemployable. In short, this holding back the work we can do when it is needed so desperately has got to stop.

Here are the shipyards on the western coast, two men worked one day, two of them, and in that one day had done as much work as they are allowed by their union to do in eight days. So they quit and didn't work for the next seven days, and sued the employer for a week's pay—at a time when Hitler was sinking our tankers five times as fast as we were building them and when our merchant fleet was being sunk about one-and-one-half times as fast as we were building it,—in a time like that, to pull punches and loaf . . .!

I tell you, there are men in this country who have blood on their hands—their hands are red with the blood of the boys who have died and who are going to die because not enough was produced and that not in time!

This is the answer—more work, per man, per hour; and the actual statistics will convince you that we can increase our production anywhere from 33-1/3 to 100 per cent, without adding one man, without working a single additional minute. There is something for the folks in Washington to give some serious consideration and it is time we stop pulling punches on anybody.

There is another reason why that is so tremendously important. We are going to go into a depression when this war is over and that depression is going to be a honey; it is going to make the last one by comparison look something like a Methodist Sunday School picnic, which is the most innocent, decent thing I know anything about.

Believe you me, we have a real depression coming. What makes me think so? Well, look at the figures for a moment. Not so long ago, a man who was running for high office in the

United States—and he is on record, said in plain English, and a lot of us thought he told the truth, we agreed with him—that a government debt of about 20 billions of dollars carried with it a threat of national bankruptcy, and one of the things we had to do was to do away with that debt—we had to stop operating at a deficit.

Well, at that time a lot of fellows got together in various parts of the country and tried to figure out how much of a debt the country could stand and the conservatives could not possibly bring themselves above 50 billions of dollars. There were a few crackpots and nuts who were not disturbed in their thinking by any knowledge of the facts, and that always helps— you can think so much more freely and prescribe so much more beautifully if you don't bother with the facts—a few of those fellows got together and said that the public debt might go to as high as 70 billion dollars. The banking fraternity and a lot of us threw up our hands—70 billion would be absolute ruin.

We have close to that now and before we are through, we are going to have 300 billion, four times as much. If 20 billions was enough to be frightened about, if 70 billions was the outside estimate of some wild-eyed crackpots, what in the world does $300,000,000,000 mean? Figure that one out!

Along with it comes the danger of inflation. You have got inflation right now—maybe you didn't think you have, but you have. The reason you don't see it is that you have price ceilings—how we all love them and yet we stand for them and we welcome them. All we ask is that they go far enough to make them actually work. It is because you have price ceilings that you are not aware of the inflation. But let me give you a few facts on that . . .

The hand-to-hand money (pulling some currency out of his pocket) which all of us wish we had more of, has about doubled in circulation—the amount of it in the past year or so. The government has been financing the war very largely by borrowing from the banks—we haven't sold nearly enough bonds, we are 'way behind on that schedule. We are now approaching the schedule of one billion a month and that is only 12 billion a year, whereas we ought to have about 30 billions a year. But we have not been reaching even this 12 billions until very recently, so the government has had to do its financing very

largely by borrowing from banks. That kind of borrowing—I wish I had the time to make it perfectly clear to you—that kind of borrowing means inflation . . . it adds so much deposit credit into the circulation of credit currency without setting in motion the industrial and commercial processes that automatically pay the debt off. So, there has been an enormous increase in the amount of money and credit available.

Look at it another way. As Mr. Henderson pointed out, by the end of 1942, the total national income available for buying goods will be about 86 billions of dollars. After the payment of taxes and everything else, there will be that much money left to buy shoes and clothing and second-hand tires and tubes—and by the way, I got a peach the other day with only three patches on it—and sugar and shoes and bread and the rest of it—86 billion dollars of that kind of money. But there will be only 65 billion dollars worth of goods to buy, so there is 21 billion dollars more money than goods, and that is inflation.

Inflation is not just an increase in the amount of money. Inflation is the *relationship* of the amount, total amount, of purchasing power available, monetary, to the total amount of goods . . . Those two ought to go up and down together, and whenever you increase the amount of money available to buy stuff, without increasing the goods, then you have got inflation. And we have got more than 20 billion dollars worth of inflation today.

Well, we hope Mr. Henderson's plan will stop it from going any further . . . It won't—it can't . . . Did any of you fellows ever try to hold down the steam pressure in a kettle by sitting on the lid while you turned the fire up underneath? You will get interesting results, but the results will not include holding down the steam pressure. Well, trying to hold down prices, just by putting a ceiling on prices, while you permit costs to go up is exactly comparable to trying to hold down the pressure in the kettle by sitting on the lid while you turn up the fire.

In short, we have to have ceilings on wages and agricultural products before the thing can really work. They are beginning to feel their way in that direction now . . . By and by somebody is going to have the intestinal fortitude to say so in plain English and then perhaps we will begin to get somewhere. We probably won't do it, so we will have the inflation.

Now, part of the answer to that is the same answer that we

need to win the war—*get out more production, more work per man per hour.* That will increase the quantity of goods available. The second part of the remedy is to take away the 21 billion dollars of excess purchasing power from us in taxes.

Someone doesn't like the idea . . . "Good Lord, here after all those years we are really getting in the money and now they want to take it away from us!" Here are five of us sitting up here . . . suppose we five constitute all of the population and suppose all of the goods we need consists of shoes—that is a peculiar function for shoes to perform, but it happens that all we need is shoes—we are going Adam and Eve one better, we don't even need to eat, all we need is shoes. There are 5 pairs of shoes, one pair of shoes apiece. Now suppose we have in the crowd of us, $15.00—that is all of our money.

We buy the shoes for all of our money—$3.00 for each pair of shoes and we each get our shoes that we can live on for a year. Now comes inflation, and instead of our having $15.00 we have $30.00 . . . isn't that wonderful? We have twice as much purchasing power as we had before—it is time to go out and celebrate. But, while we have $30.00, we have still got only five pairs of shoes and what does it matter how many dollars you have, when you have only so many goods? We are just exactly as well off as we were before—we get each one pair of shoes, only now they cost us $6.00 a pair, instead of $3.00.

Then, when we have the $30.00 among us, some unconscionable rascal comes along and says, "We are headed for inflation, we have got to stop it, have to take away half of your income." And the five of us lift our hands in holy horror,—"Take away half of our income? That's an outrage!"—And we make a real speech—almost good enough to be elected alderman!

But when they have taken away half of our monetary income, the marvelous thing is that there are still five pairs of shoes, and once more, we pay three dollars a pair for them. So what does it matter? We are just kidding ourselves if we think it does any good to have a lot of money when we have no place to go with it . . . The guy has a perfectly good automobile—what good does that do him if he cannot get any gas? What good does it do to have thousands and thousands of dollars—if the stuff is not there to buy with it?

Let's quit kidding ourselves—let's not fight high taxes—we

are going to pay for the war one way or another. Let's not slow down on the buying of bonds—let's keep in mind every penny of purchasing power above the goods available at present prices has got to be taken away from us, either in taxes or bonds.

Now, the other side of it is to produce more goods. Suppose the fellow raising wheat, with the same amount of effort and capital raised two bushels . . . swell, then we get more goods. Suppose a man does more work every hour, turns out more stuff without getting more money for it—and that is what we all have to do—then there would be more goods available and that is the other way of stopping inflation. But, we are only kidding outselves if we think we can escape paying that particular price and the answer again, you see, is "more work, per man, per hour." The appropriations mean nothing until they are turned into goods and the whole thing begins with all of us recognizing that the war has got to be won first.

One final thought: There will be a national debt, a government debt, of pretty close to 300 billions before we are through—that may be off quite a bit—it may be more or less—but certainly it will be 'way over 200 billions. Will that debt ever be paid? It would not be patriotic, would it, to suggest that the bonds might never be paid . . . I like to be a realist, however . . . I will tell you what I would like to see happen—I would like to see the total war financed by bonds, everybody with his fair proportionate share of the bonds, and then when the war is over, have us all get together and adopt a resolution that will say, "This doesn't mean anything, because we owe it to ourselves—let's all burn our bonds!" And then burn them all. (applause).

That would be the way to do it. Unfortunately, while that is a realistic way of approaching it, it is not going to happen. What is going to happen is that while we have a pretty widely scattered ownership of bonds, the people who own the bonds will want to be paid when the war is over. Don't kid yourselves about that—you and I can applaud the idea of burning the bonds and believe in it,—but 130 million people won't, so it has to be paid in some way.

How? How? That is more than three times the biggest annual income we have ever had and in the last analysis it is going to lead in possibly two directions, unless you are almighty careful in the days before the thing actually happens. One is

that we will have to set up a complete totalitarian, regimented economy in this country. It is being done now, necessarily, to win the war. Even your priorities, before you have gone very far along from this point, are going to be taken away and we will have allocation, rationing of everything. It has to come, in my judgement, and I think Washington is seeing that rather clearly already.

We are even going to make people do the kind of work we want them to do—we are going to assign men to do this and do that, before we are through, with out total economic life in the hands of a relatively small number of people. You can call it by any name that you like, but in essence it is the same thing that they have got over in Europe . . . it comes by necessity when a nation is unable to meet its obligations.

The other thing that may come with it might be a capital tax. It might be such a heavy tax that enterprise is discouraged; and there is very real danger of seeing over here what has almost always happened, if you read history, and history repeats itself for the simple reason that human nature does not change very much. As it has always happened in history, it means a destruction of the middle class. You men as a class, a middle class, small businesses, face complete destruction when this war is over, unless we reform our present war effort, produce more per man per hour, and unless we work out some way to renew our activities when the war is over, on the basis of private, competitive enterprise.

That is one of the problems that you face, and you don't dare wait too long.

Exactly what can be done now? We can quarrel about it from now to Doomsday, but one thing you can do, and it has not been done yet—is to insist that, no matter how far these limitations on our freedom go now, and they must go far,—that when the war is over, those controls will be relaxed and we will be given back the liberties which we relinquish now . . . We have to have a guarantee of some such sort, for believe you me, there are plenty of men in strategic positions in this country, honest, sincere men, not handicapped by any too great experience, who are working deliberately in the direction of setting up a totalitarian, regimented economy.

I know whereof I speak and if we ever are destroyed in this

country, it will be as Abraham Lincoln once said: "Not from without, but from within". It will not be a case of murder—it will be a case of suicide by a people who do not prize their liberties high enough to work hard for them, to make sacrifices in time for them, and to be willing to take the pain and discomfort and work that always accompanies liberty, rather than reaching out empty hands and asking someone to give them something.

We have had the "gimme's" in this country far too long and that includes business along with everybody else. I helped write the NRA, I wrote the model code and every time now when I am reminded of it, I feel a feather sticking in my throat—I had to swallow that damn blue eagle for my share in that job. The whole NRA was really an effort on the part of business to escape its own responsibilities, and it made a bargain with labor whereby labor got the right of collective bargaining and business under various names got the right to fix prices. What we have to do now is work, work as we have never worked before! That is the answer.

Even Hitler gets it under his regime—slaves to be sure and they have to be driven—no 40 hours work over in Germany or in France, but 60, 80 hours and more and paid barely enough to keep body and soul alive—no talk about social gains and one thing and another. Whole nations are completely co-ordinated and oriented in one direction. They know they have to win or they are through. No less is true of ourselves.

Now, can it be done on the basis of the figures? No, it cannot be done on the basis of the figures. The output per man as it has been must be stepped up and stepped up greatly. We have to increase the efficiency of management as it has never been increased before. It can be done. It is being done, and just to give you a little encouragement, let me give you the experience of Rastus, who found the way it can be done.

He came rushing in one day to the boss' house, "Boss, I done see the funniest thing today!"

"Well, what did you see?"

"I done see a rabbit climb a tree!"

"But, Rastus, rabbits don't climb trees."

"Well, Boss, dis yere rabbit, he climbed a tree."

"Now, Rastus, don't be foolish . . . tell me about it."

"The dogs and we was goin' down de field, when out of the

bresh, all of a sudden, jumps a great, big ole jack rabbit. He see de dogs, de dogs done see de jack rabbit. De jack rabbit run, de dogs run after him; de dogs was gaining and they was just about right behind dat rabbit wid dey moufs wide open, ready to take a bite out of his hind leg, when WHOOSH!—up he jumps in a tree—"

"But, Rastus, let me tell you finally, rabbits don't climb trees!"

"All right, Boss,—but done let me tell you permanently and finally, and for de las' time,—this yere rabbit,—he *had* to climb a tree!" (applause)

PRESIDENT CANDEE: I wonder if everybody feels as I do, that it is time to heave a sigh of relief . . . We have had a peek at a problem that is so large, of such magnitude, well, it is beyond my comprehension—and I like to think I am not the dumbest man in the room.

It may be that some of us would like to pick out a particular small point and ask Dr. Haake his opinion on it . . . he has consented to discuss the thing for any time we desire. It was announced as a round table discussion, although I will admit it would be a little difficult to get this crowd around the table.

At this time I would like to turn the meeting over to Maurice Caldwell, the President of the Grand Rapids Branch, and he will conduct this question period.

MR. CALDWELL: Well, let's take about ten minutes and discuss this. The reason I say ten minutes is because the Research Committee is having a meeting soon . . . in fact, if those men would like to excuse themselves so that we can carry this on far into the afternoon, if it becomes necessary, it is all right to do so.

I am sure some of you men have some finer points you would like cleared up.

MR. W. F. CASTELL (Delco-Remy, division of G. M. C., Anderson, Indiana—Member, Anderson Branch): Ever since yesterday, I have been thinking what we can do, or rather, what I can do as a plater. We heard yesterday morning the man from Washington telling us about their tremendous job, a giant job and I have the conviction that we have to help in that job and naturally, as I am a man of somewhat simple mind, I ask myself what can I do and I walked the floor last night, and I

thought it over . . . I naturally have to work harder, I have to put everything in this, my job . . . You and I, we know how to plate, we know our jobs, we are part of it, and in many things we can help, but here is one of the most important things, to me: If this meeting is of any help, we want to give the men from Washington the absolute faith in us, that we are to sacrifice and adjust our industrial facilities in such a way that they can issue their orders with the feeling that we will execute them and what I mean by execution of those orders, is to do it immediately, now, without argument.

There are many things disturbing today in those orders . . . it is difficult to find out sometimes exactly what they want from us, but still we want to pledge to them that we will do it regardless what the cost to us . . .

And now there is another thing—we want the men in Washington to have confidence in us and we naturally—we can only give it to them not in speeches, but by simple deeds . . . but there is something just as necessary, just as important and that is that these men have absolute confidence in us when they issue those tons of paper, whatever it might be, to tell us what to do, they have the feeling we will do it, and only a mutual faith in each other can do the job . . . Such a faith between men is unconquerable.

CHAIRMAN CALDWELL: Thank you for that comment. Any other discussion?

MR. A. T. LEONARD (Superior Plating & Rustproofing Company, Minneapolis, Minnesota—Member Chicago Branch): I would like to ask Dr. Haake how long after the war he expects the depression or the Methodist picnic?

DR. HAAKE: I wish I really knew the answer to that question, but it will not be immediately after the war. If you study history, and I have no doubt you have, but study it from this point of view, particularly, you will discover that those depressions come anywhere from three to ten years after the war and the depression that hit us in 1929 was really the aftermath of the horrible distortions and dislocations caused by the World War, which ended in 1918.

The immediate effect of the war with all the goods it had destroyed in the world and the people that needed to be fed, was to give an impetus to industry. You remember that. It was

financed very largely on credit, which in turn further distorted the whole picture and it was more than ten years before the storm finally broke.

Now, it might be one year, it might be five, it might be ten, nobody knows—nobody has any way of telling. However, I can give you a principle by which you can measure it from time to time, if you wish to: The certainty with which it comes and the severity with which it comes, and the time which it lasts, will be in direct proportion to the amount of dislocation and distortion in our economical life. We are now setting up these enormous factories all over, and bringing people down to them . . . it has been done, as our President has said, for strategic reasons which at the moment are more important than anything else. But when the war is over, here is a great, big plant at Milan, Tennessee—people have been drawn in from miles and miles around . . . Radford, Virginia, once a sleepy, little town, where they still use horses and buggies, because they like to feed the horses and like all that goes with them,—that little town has grown almost over night into a town of thousands and thousands of people. When the war work stops, there are the people. What is going to happen to them?

You see, they are going to have to be shifted somewhere else or the factory readjusted to make something else and for a while we are undoubtedly going to have a relief roll that will make the other one look, again, like a Methodist Sunday school picnic. We will have a pretty large one for a while, then we will get under way.

Now we are going to attempt to feed all Europe—You see, we are an altruistic people—at least, our leaders tell us so—we are going to see that every human being in the world has at least one quart of milk a day and what goes with it. Incidentally, if we share our standard of living so as to bring all others up to our level, or, us down to theirs, we face the pleasant prospect of giving up 80% of your standard of living. While we are not going that far, we are going a long way to help the rest of the world to re-establish itself. That is going to mean a feverish and extended activity for some time, so the distortion will continue and continue.

Now, unless we do something that was not done in the past period, then maybe five years, ten years, nobody has any idea

just when, that depression will hit us. I think I have the answer for you—I won't take the time to give it to you, but I will give you the clue—I have been trying it for some 12 years, using the furniture business as a guinea pig.

You see, a depression comes in as a consequence of enforced liquidation; enforced liquidation comes in as a consequence of distorted economic structure.

The interesting thing in the past has been that one industry which went ahead like this, while another went like this (indicating with his hands), and we did not know what one had developed too far in relation to others until it was too late to do anything about it. Now, if business could know how far it is distorted at any one time, we could then ask certain industries to hold their horses, for a while, until the rest of them catch up, and the relationship becomes balanced again. That is not easy, but there is no substitute for it.

I don't know whether that answers your question fairly or not, but that is the best I can do.

MR. ROBERT J. GREEN (Alsop Engineering Corporation, Waterbury, Connecticut—Member Waterbury Branch): I would like to ask him if after this war is over, if they keep the price ceilings they have now, would it make any difference on the depression, so to speak . . . in other words, if they keep a ceiling on the goods as they're putting them on now, then when the let-down comes, if they keep that ceiling on, would it have any tendency to balance things?

DR. HAAKE: Frankly, I don't know: I cannot point to any historical precedent that would give you the positive answer and I can only do what everyone else has to do—to speculate on the basis of such things as we have been able to measure. Generally speaking, all efforts to control an economy through the control of price has failed; Every one of them eventually has failed, and where they have not failed so rapidly or so decisively, it has been where there was complete government control and a minimum of liberty.

Now, if you are willing for a period of time to have no freedom of choice, to accept conscription of labor, the rationing of goods, the complete regimentation of production, distribution and consumption, because you cannot control prices unless you also do that, if for a while you were willing to do that and let someone

in Washington tell me how many barrels of sauerkraut I can have each year, and see to it that I use them after I get them—and so with everything else,—if you are willing to accept that, then undoubtedly the price fixing control will help ease us off. But never forget, that while you are continuing and strengthening that price control and all that goes with it, you are getting just that much farther away from all of the things for which this country stands.

I have an idea that if we did what you suggest, the possibility is that later on, we would find the shift back to a free economy even more difficult that we would in the beginning. So my thought is that we would want to take the price restrictions off just as rapidly as the supply of any commodity justifies taking it off . . . In other words, keep it on only in connection with the rationing. If you don't do that, then of course, the price is going to shoot sky high, because of the present short supply available. But as we correct the relationship of demand and supply, prices will come down again.

I rather shrink from continuing the price control devices, except as a means of greater utilization of our goods, and if I had the say and even had to take the responsibility, I would favor removing them entirely, once the war is won.

MR. F. C. MESLE (Oneida Ltd., Sherrill, New York—Member Rochester Branch): I would like to ask the Doctor if he thinks that the pensions and unemployment insurance features would act as a sort of cushion for the next depression especially during the period of our industrial readjustment as compared to the last?

DR. HAAKE: I think the answer to that question is yes. I am going to qualify it, however. It would undoubtedly be yes, *without* any qualification, if the funds which have been collected for that purpose were available. They are not. You see, in theory, we have built up huge funds, social security funds. The theory back of it is splendid, but you will recall also that the law provided that those funds should be invested in government bonds or bonds or securities guaranteed as to principal and interest by the government, and the funds have been put into government bonds, the money itself expended by the government. The bonds are just as good as the ability of the government to operate in the black . . . I see a question on your faces

. . . . When that time comes, we will probably borrow more money and use the new funds to pay the benefits. So I do believe it will operate as a cushion.

MR. WILFRED S. McKEON (Sulphur Products Co., Greensburg, Pennsylvania—Member Pittsburgh Branch): I would like to ask Dr. Haake to answer this question for a very ordinary person—and possibly there are many others who are just as stupid as I am—isn't it true that such a thing as national bankruptcy is wholly impossible? In other words, the way I look at it is this: I own one-thirty-fifth-millionth of this country and more of that is not owned by your good self or by the President and if you and I own a corporation and we take all the money out of it, divide it between you and me and bankrupt the corporation, what is the difference? Therefore I would like to ask you, is it not impossible for the country to go bankrupt?

DR. HAAKE: That is a splendid question. As a matter of fact, it is impossible for a nation as such to go completely bankrupt until men can no longer work and until there has been completely destroyed that thing we call character. So long as there is character and the capacity to work a nation as such does not go bankrupt.

A government goes bankrupt when its income is insufficient to pay its bills, just exactly as you and I do . . . In other words, you have three units to think of here—you have the nation as such, which is a composite of 130 odd millions of individual human beings; you have a government which consists of human beings and certain statutes and requirements and obligations and rights, etc.,—an entity by itself; and then you have the individual human being, each one by himself. The government *can* go bankrupt because the government may be unable to raise the money necessary to pay its bills—unless you put it off long enough—that is where government has an advantage over you and me . . . if you and I get into an insolvent condition, the sheriff does not wait very long,—but you cannot sue the government—all you can do is change the personnel and the chances are that a government would go on and on, and if the time ever came that the people through their character and their work were able to produce enough over their needs to pay this debt off, then the government would again become solvent. But, when everything is gone, money is all gone and you have de-

stroyed the classes, because that process would destroy the middle class, the fact is we would still have the factories, still have the land, still have men able to work, still have management, still have the sun, rain, still have God and perhaps we have come closer to recognizing Him then,—sometimes it takes this sort of thing to make us realize there is one—and we could start all over and go on.

CHAIRMAN CALDWELL: I believe due to other activities which are taking place this afternoon, we had better draw this meeting to a close and let's give Dr. Haake another rising vote of thanks!

. . . The audience arose, applauding, in tribute to the speaker and the meeting adjourned at two-forty-five p.m.

MR. SMITH GOES TO DETROIT

Mr. Chester W. Smith, Chairman of the Grand Rapids Convention Committee has severed his connection with the J. C. Miller Co. of Grand Rapids and has accepted a position with The Detroit Rex Co.

We wish him every success in his new undertaking.

ATTENTION PLEASE

"Mr. Joseph B. Kushner, Ch. E., Metal Finishing Consultant, 233 W. 26th St., N. Y. C., **is in no way related to or connected with** Mr. Kushner of Kushner & Pines, Inc., Gold Refiners, 21 W. 46th St., N. Y. VC."

Thanking you for your cooperation and trusting this item will appear in the July issue, I am,

Sincerely yours,
JOSEPH B. KUSHNER.

To Members of the Amercian Electroplaters' Society in attendance at Grand Rapids:

The writer appreciates very deeply your expression of good wishes to me while recovering from an operation at the New Haven Hospital. I regretted greatly my inability to attend the convention, and hope that I may be physically able to serve the Society in some way during the coming year.

Sincerely yours,
WALTER R. MEYER.

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Conservation Program of WPB Speaker

By HARVEY A. ANDERSON
Chief, Conservation and Substitution Branch, Bureau of Industrial Conservation W. P. B.

Read at the A. E. S. Convention in Grand Rapids 1942

COMING as the third speaker of a group of people down in Washington, I am unable to give the recorder an opportunity to know in advance what I am going to say, because I could not know until I had heard what our other WPB speakers had to say. I will try to find a few spots that have not been covered in these excellent talks that we have had.

This morning, as I came through my birthplace, a few miles south of here, I realized that at least from the standpoint of age, I would be qualified to be one of the trio of oldsters that the Chairman is handling this morning, because in a couple of years it will be 50 years since I started life down here in Plainwell, a few miles south.

This is my second war in Washington. I went down by request in April, 1941, to help out on the problem of die castings and have been asked to continue on down there with the manifold materials conservation problems which have arisen.

It looked to us a year or so ago as though the problem down there would not be much worse, this war, than it was in the last war. Then it was largely a case of trying to find the best material for each purpose. Today it is a case of trying to find the most suitable material which is available. It makes us all feel small.

I am reminded of a story of an occurrence in Washington about a week ago. They just got a new Chief of the Iron and Steel Branch down there — Reese Taylor . . . He came from Los Angeles, where he was president of the Union Oil Company, — to take the place of C. E. Adams. Mr. Taylor, by the way, is an old steel man — he had been in the oil game just a few years . . . Reese is one of these big boys, about 6′ 4″, weighs 250 pounds . . . He was in the other day, talking to Sidney Weinberg, the assistant to Mr. Nelson, and he started in with all the vim and vigor which is so characteristic of him, telling how he planned to remake the Iron and Steel Branch, correct all the deficiencies he thought existed there, simplify the whole job.

After he had gone on a little while, Sidney interrupted him and said, "Reese, you're a pretty big man, aren't you?"

"I guess so."

"How tall are you?"

"6′ 4″".

Sidney said, "You're big in every way . . . How much do you weigh?"

"250 pounds."

"Well," he said, "You know how big C. E. Adams is?"

"He is a small fellow — about 5½′ tall, weighs about 140 pounds, I guess."

Sidney said, "You know, C. E. Adams was your size when he came to Washington." (laughter)

It does take the measure of a man down there. It is a job that is bigger than any of us. It is a job that cannot be handled from Washington. It is a job that necessitates the co-operation of all you people that are so capable at working independently in this country.

The group that I am associated with down there, the Bureau of Industrial Conservation, attempts to serve a staff function in channeling scarce materials into the avenues where they will be of the most value in the war effort.

We have several conservation groups in OPM a year ago and last fall Mr. Nelson drafted Mr. Rosenwald (Lessing Rosenwald, former chairman of Sears-Roebuck) to correlate the various conservation activities. He pulled in various groups, so that now we have a Specifications group under C. L. Warwick of the American Society of Testing Materials. They have the problem of studying the Army and Navy Specifications and attempting to eliminate wherever possible all inconsistencies, all requirements which are not essential or cannot be met with the materials at hand and, as far as possible, to try to get government organizations to buy from uniform specifications.

Howard Coonley, the Chairman of the Walworth Company, heads a Simplification Branch, which, as its name implies, is attempting to foster reduction in the number of varieties, sizes, shapes and colors that result in increased inventory, increased consumption of material and less availability for war purposes.

They have succeeded in making reductions in a great variety of things, bringing down the number of colors of dyes in hosiery,

number of sizes, and shapes of glass containers, and a variety of other activities in the direction of simplification, carrying on in co-operation with the Bureau of Standards, which has been handling the simplification work for a number of years.

Then there is a Salvage Branch headed by Paul Cabot, which is attempting to bring out into usable channels all of the inactive critical materials, which are laying around the country. It is divided into four sections: (1) General Household Salvage, which had some connection with the unfortunate aluminum drive, bungled by our friend, the "Little Flower" from New York, because he would not allow the scrap dealers to take the very essential part which they must play in any salvage program. Our salvage group went out after paper, a campaign which, as you know, has been so successful that temporarily we have gotten quantities of scrap paper in excess of the paper mills' and paper box manufacturers' requirements.

They are going out after old metals with such success in the case of steel, that, last week, for the first time in many months, there is not a single open hearth furnace in America that was down because of lack of scrap. That has been an accomplishment which the discouraged and pessimistic people said could not be done, that we would have shut-downs, but a very effective job has been done in bringing in the old metals.

The little town I come from, in Illinois, put on a campaign a couple of weeks ago. One Sunday the men of the village got out and collected old scrap metals and rubber. In a town of 6,000 people, in one Sunday, they were able to bring in over 70 tons of scrap material. The country is full of this and we can get it out if all of us do our part. Today the rubber campaign needs special emphasis and special co-operation.

Then they are going after old rags which can be used to good advantage and also including in their campaign now, fats and greases and bones, where the glycerine is so needed.

Then there is another group in the salvage branch which has to do with (2) Industrial Salvage. They went to airplane plants last summer, getting them to classify their aluminum scrap, so that instead of selling the aluminum alloys out the back door, they are being returned to the original fabricators to be reworked and made into new, strong alloys. Classification of scrap is the secret of the whole program.

In connection with industrial salvage, it is interesting to note that one steel company which was pessimistic about the shortage of scrap and which had never been accustomed to do anything on its own part to increase its flow of scrap, felt they were going to run short. Our Industrial Salvage section suggested to them that they see what they could do to help themselves. As a result of considerable prodding, they went out, searched their plant, and found 125 carloads of obsolete scrap within the boundaries of their own plant. This is an example of the way in which self-help often will solve the problems that face you. Just as Mr. McCord told you, it must be the method of solution in your case.

Then there is another salvage group that is working on the (3) Automobile Graveyards. They started it in Maryland and there they were so successful that the number of junk cars that were brought back for remelting into steel exceeded the total number of cars that the preliminary survey had indicated were available in all the junkyards of the state.

The method that is being followed is to give the junk yard owners 30 or 60 days to strip the cars down and get out the non-ferrous metals and anything that is usable. At the end of that time, if they have not done their job and are not ready to sell their junked cars, our people walk in and take them over. You may recall seeing newspaper accounts of such requisitions. We have to get that scrap and if dealers expect to hold it for a source of income in their old age, they are due for an reawakening!

There is a (4) Special Projects Salvage Section which is attempting to get all of the old rails from the abandoned railroads and the steel from old bridges and old buildings. Many of these projects are tied up with legal restrictions and they have to be cleared, so that they can be wrecked. A bridge in Maryland was secured in that manner, and some of the old remaining tracks of the Boston-Westchester—a couple of streaks of rust have been pried loose so that they can go back and be melted. All over the country large amounts of these obsolete utility and governmental properties are being made available for salvage purposes.

The fourth one of the branches in the Bureau of Industrial Conservation is the Conservation and Substitution Branch, with which I am associated. We, as the Chairman has indicated, have contact with a large variety of materials, all the way from

iron, steel and ferrous alloys, to rubber, textiles, paper and other non-metallics.

The whole attempt all the way through is to see if the materials which are scarce for military needs can possibly be replaced with something else that is satisfactory for civilian needs, or something else which is satisfactory for the less essential military needs.

Essentially, there are only three reasons why the War Production Board issues orders; in the first place, because the manpower is needed, and in the third place, because the facilities, including transportation, are needed. One of those three reasons is or should be the guiding consideration in every case of the issuance of an order.

Now, of course, if we were able to be foresighted enough, these orders would come out in a logical sequence and in time so that it would not dislocate industry nearly as much as has been necessary with the volume of orders that have been issued recently.

Just last week this book on priorities reached my desk (holding up a copy) . . . this represents in very fine type the list of P, L, M, E and S orders which the WPB has put out in its short period of life.

It is an enormously complicated job, but throughout the whole thing, certain objectives are apparent. For instance, last summer we sent to the War and Navy Department a list of critical materials and told the War and Navy Department, "If you don't design downward to the less scarce materials, there is going to be a shortage for military needs, irrespective of civilian requirements."

That list still holds fairly good, with magnesium at the top, a metal which is relatively scarce still, but is going to be an extremely abundant material.

For many years, the only source of magnesium in this country was a plant up here in Michigan. The Dow Chemical Company subsequently put in new plants at Freeport, Texas, where they are getting increasing amounts of magnesium from sea water,—an inexhaustible reservoir; natural gas, seashells and sea water are practically the only raw materials that are required. Magnesium production is increasing rapidly because luckily the British authorized construction of a plant down there long before we got into the war. There is also a new magnesium plant built at Las

Vegas, New Mexico, another in California, and a new plant is going up in the Pacific Northwest. The sum total of magnesium production will be increased 60-fold over what it was before the war.

Magnesium will be an abundant material and something it behooves you all to learn more about to be prepared for the post-war period, but magnesium is not yet available in quantities that are needed for war purposes. We are 'way behind the Germans . . . electron metals were more abundant there in the last war than magnesium metals were here at the beginning of this war. Eventually this country will catch up.

Aluminum has already been discussed. We are in much the same position on that, except that the expansion that had taken place before the war provided us with a larger quantity, amounting last fall to about 70 million pounds of aluminum a month and it is going to go up until we will have a capacity of over 2,000,000,000 pounds a year. However, that amount of aluminum is not available yet and aircraft needs practically every pound of new aluminum we have.

There has been some loose talk about a surplus of aluminum; that is not a true surplus. The apparent surplus that exists has been due to failure of the fabricating facilities to keep up with the ingot production. There is some shortage of production capacity in sheet and extruded forms and forgings, but that is rapidly being rectified. With the contemplated expansion of the aircraft program, the aircraft demands for early 1943 will still be ahead of the aluminum production.

Nickel has also been referred to. The International Nickel Company spent some 35 million dollars last year to increase the output of nickel by 50 million pounds, but the output has not kept up anywhere near to the increased demand. The requirements from our Allies have gone up. New Caledonia, which was a source of a small part of our nickel, is being held by the Allied troops, but the conditions for shipping are not at all favorable. The nickel situation is so tight it is becoming necessary to take nickel out of armor plate, an application which is certainly a primary combatant use. You must realize that when nickel is taken out of armor plate and out of superstructures on board ship, there is no excuse for any claim that the use of nickel is necessary for plating except for military applications.

The potential tin shortage was not fully realized nor anticipated before the Pearl Harbor catastrophe, but practically all of our supply of tin came from the Dutch East Indies and Malaya and was smelted over in England. Today we have just gotten into operation a new tin smelter at Texas City, Texas, which has a limited capacity. It was originally designed for 1500 tons a month, which is a mere bagatelle when you realize we consumed over 110,000 tons of tin in this country last year. We call tin an irreplaceable metal . . . we have some stock piles, thanks to the buying of the RFC, but not nearly enough. Part of the blame is due to the International tin cartel. What we use in tin we cannot expect to replace in any considerable per cent for several years.

We have about four detinning plants in this country, a couple in New Jersey, one in Pittsburgh, one in San Francisco and approval has been given for the construction of six additional detinning plants. The danger is that with a reduction in the amount of tin or tin plate for tin cans we will lose the chief source of raw material for the detinning plants. The maximum permissible tin coating was reduced from 1.65 pounds per base box to 1¼, and the can people are going as rapidly as possible to ½ pound electrolytic coat and even cutting out tin plate entirely on a great many containers,—I notice that dog food is coming out now with no tin—they are using paper. Dog food alone took one billion tin cans last year, and oil took one-half billion tin cans. Most similar items are prohibited now for packaging in tin, so that there is going to be a decreasing amount of raw material for the detinning plants. It causes the WPB serious concern as to whether or not to take critical materials for the construction of detinning plants when the cource of raw material is being cut off.

Then copper, which has been referred to—the predictions on that become more pessimistic every time you hear them. The Army and Navy requirements are going up, even with the substitution of steel cartridge cases for brass. Our naval requirements are constantly increasing and the picture on the sources of supply is not comfortable.

A new open pit mine just came into production in Arizona in January—they spent some 35 million dollars down there to produce 75,000 tons of copper per year from low grade ore. With

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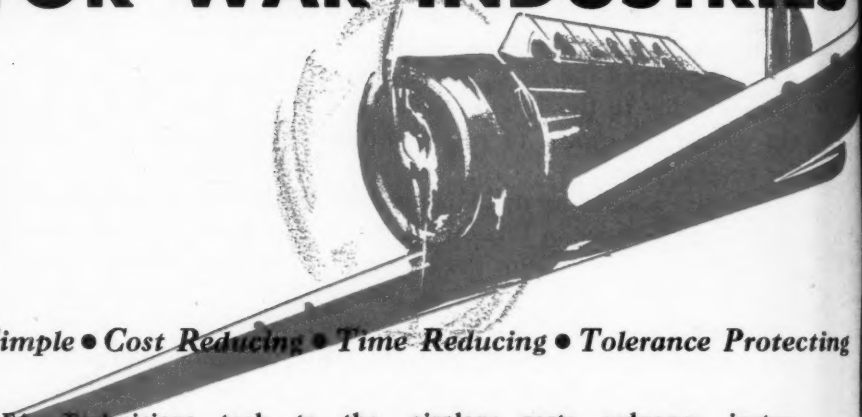

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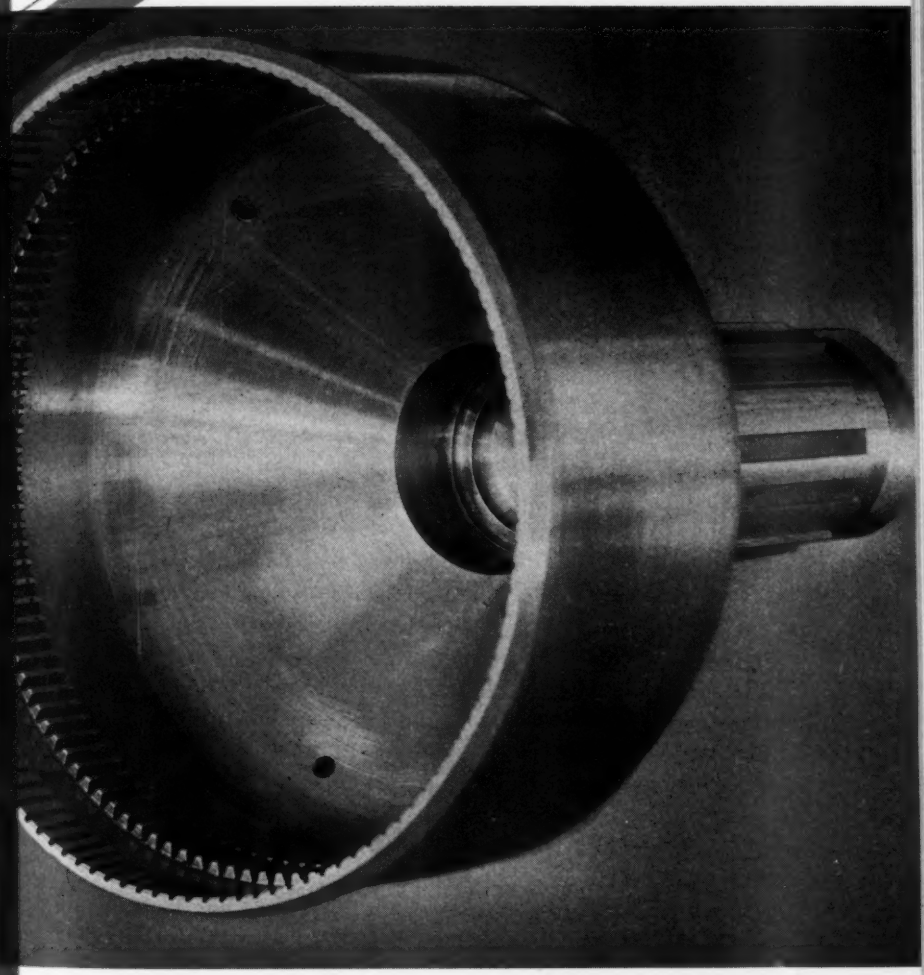
URRING METHODS



Typical of parts on which Lea Polishing and Burring Methods are used

opment of Production Methods and Compositions

that increase and with the bonus which the RFC has arranged to pay the high cost producers over the copper ceiling, we are still unable to increase the supply here to anywhere near what we need. We are faced today with a very serious condition in the reduction of imports. About one-third of our copper ore came from Chile; bottoms today are tight; a lot of ships that formerly touched at South American ports and came up with ore in their holds, today are making a rapid turn-around from Australia and coming back to the Pacific Coast to load up with supplies for MacArthur and his forces in the Far East.

As a consequence, we are getting less and less copper in from South America, just as we are getting less bauxite in from British and Dutch Guiana because of the shipping of our ships over to the other side of the Panama Canal.

Those five metals are and bid fair in the next few months to be available in inadequate quantities for military and associated essential civilian demands—such things as construction of military facilities and provision of defense housing.

The zinc and lead pictures are a little bit better, although the situation on high grade zinc is not nearly as optimistic as was predicted last fall. Last month only 15% of the total lead went into the "kitty" which is allocated by the WPB. The balance still was being shipped out to customers by the suppliers without full control. One of the objectives of the Conservation and Substitution Branch at this time is encouraging the use of lead in place of the other more critical metals.

The steel situation is becoming increasingly bad. I spoke before the Air Conditioning and Refrigerating Congress in Chicago a couple of weeks ago and a number of people came up to me after the meeting and said, "Why should we not use brass as a substitute for steel, because we can get the brass and we cannot get the steel."

Well, that situation was referred to by Mr. McCord. Our inventory and requistion operations have not worked out as fast and as adequately as they should have. We need all of the copper and copper alloys including the scrap for strictly military needs and will need them for many months. The mere fact that somebody has some of that scrap is no excuse for using it for non-essential applications and certainly not for substituting it for iron and steel. Although the deliveries are slow in iron

and steel, we have some 80 million or more tons of steel and only about two million tons production of aluminum and copper. The difference in estimates of annual production of iron and steel is as great as total production of aluminum or copper will be next year. You have to keep your proportions straight or you cannot reason satisfactorily with a local condition where there may be a little excess of brass in the hands of some user temporarily.

The announcement was made in the papers recently that some of this steel expansion is going to be given up, because of the fact that critical materials which are required to build new facilities will have to be taken away from the construction of shipping and guns and planes and tanks today. Today is when we need these things. As Mr. Nelson put it, we have to use the "silver months" to maximum advantage.

I am not going to go into the other non-ferrous materials, alloy and plating materials, because they have been adequately covered, but I want to say a word more about silver. I have been pretty close to that deal down there . . . We have been trying our best to get a set-up whereby silver will be available for unlimited use in industry. You recall the announcement in the paper that we got the approval of the treasury and RFC to the use of 40,000 tons of silver as a substitute for copper and bus bars in the new aluminum and magnesium plants. That represents a non-deteriorating use, where we can return it to the Treasury Department after the war and it will be equally as valuable and there will be no appreciable loss involved.

Today we import about 3500 tons of silver a year and we produce domestically about 2500 tons. The treasury offers to buy the foreign silver at 35¢ a troy ounce, but actually industry is now paying 35-5/8¢, so the treasury is not buying much foreign silver. However, the treasury is obligated to by all silver of domestic origin at 71¢ a troy ounce and it is not permitted to sell any silver until silver bullion either attains a certain ratio to the gold holdings, which is fantastic, or until silver passes the price of $1.29 a troy ounce, which is its monetary value. It is unfortunate that adequate silver is not available for industry when we know, for instance, that we can substitute solder containing around 2% silver, balance lead for 40%-60% and 50%-50% tin-lead solder.

We have adequate silver in the vaults up at West Point, which cannot be used because of the legal restrictions. We estimate that approximately 8,000 tons of silver could be used annually in industry as a replacement for critical metals in war equipment if there were no legal restrictions.

Reference has been made to the use of gold for plating. Several weeks ago I visited the California Institute of Technology and Dr. Clark showed me some work he had done a couple of years ago in connection with a silver investigation, namely, plating a few millionths of gold on top of silver. The suggestion has been made by some people that the gold would diffuse into the silver and the resulting alloy would not have the nobility of gold. That was found not to be the case. Even when samples were given what he called the egg test, i.e., boiled with ground, hard-boiled eggs, and baked at 1100° and 1200° F., there was no tarnish apparent and even two years after the time that these specimens had been prepared and tested, the gold still was visible there in the form which indicated it had real merit as a protection from tarnish of the silver.

That is one of the things that is being considered along the lines Dr. Blum suggested for surgical instruments. I was in the office of the Under-Secretary of the Treasury some time ago asking for the loan of silver and he said, "When are you going to come back and ask us for our gold?" I said, "You will be surprised—we have already got plans for it." In a country that is whole-heartedly all-out for the war, we ought to find economical uses for as much as possible of our gold and I solicit your help.

One thing that I have not heard mentioned this morning is a coming development which is going to have some real value. That is the application of chromium plating on silver. It is being done satisfactorily and will be discussed at further length here in this meeting. Mr. Hogaboom of our staff is prepared to give some of the information which has been developed by the Underwood-Elliott-Fisher people and it looks very promising.

From the standpoint of the electro-tin-deposition, we are doing the best we can to foster the utilization of the tin plating facilities of the shops of the type in this vicinity prior to the availability of the strip plating that the steel mills are putting in. The indications are promising that some work will be done, but of course, it is more expensive and there is considerable

resistance. The steel companies would rather put in their strip plating lines.

Today the anomaly exists for the can manufacturers that black plate seems to be the neck of the bottle, rather than the tin which has been allocated for coating. However, every possible pound of tin should be saved, and considerable quantities could be saved by using these batch plating methods that are available in your plants with relatively small changes.

These things move slowly. We have an enormous organization, but we are doing our best to help you out. I want to close by stating again that there are only three reasons why orders are issued: We need the materials, need the manpower, or we need the facilities and if any one of those three necessitate changes in American industry in order to win this war, and win it speedily, I know every one of you is willing to make the necessary sacrifices.

Thank you! (applause)

CHAIRMAN CALDWELL: We have about ten minutes, or longer, if necessary, for a discussion period. Are there any questions?:

DR. K. SCHUMPELT (Baker & Company, Inc., Newark, N. J.): The speakers we have heard today discussing materials which can be had and materials which should be replaced have not mentioned the one metal which today still is available and regarding which no government restrictions have been announced; this metal is palladium, one of the metals of the platinum group, and in its properties, very similar to nickel.

The color as well as the hardness of palladium are almost identical with that of nickel.

MR. ANDERSON: How much palladium have you got?

CHAIRMAN CALDWELL: Dr. Blum, can you officially answer that?

DR. BLUM: I would rather Dr. Schumpelt would tell us and add to the picture the availability and approximate price of plating.

DR. SCHUMPELT: The price of palladium at present is about $24.00 per ounce. There is no reason to believe that the price should not be fairly stable because the amount of metal available is rather large. During the past ten or twenty years, palladium has been accumulating due to increased production

of Canadian nickel ores which contain an appreciable amount of platinum metals, particularly platinum, palladium and rhodium. So far, no commercial or industrial applications for palladium have been found big enough to make a dent in the accumulated stock. I have no definite figures regarding the total amount available, but I can say it is rather large.

MR. ANDERSON: I would like to say that I have had considerable experience with palladium in my position with the Bell Company; in precious metal welded contacts in telephones we have found palladium a quite satisfactory substitute in a number of instances for gold-silver-platinum contacts. It is not as hard as some of the other platinum group metals and it does not have quite as good characteristics from a non-sparking standpoint for current carrying contacts, but it does have a lot of possibilities. I think the Bell System is one of the larger users of palladium for industrial purposes.

DR. SCHUMPELT: Another thing about palladium which should be of interest to the plater is the fact that a palladium bath is available which can be operated on the same basis as for instance, a nickel or silver bath. Once the electrolyte is made up the metal is replenished from the palladium anode. Anode and cathode efficiencies are practically 100%.

Very recently a palladium bath has been put in operation to plate surgical instruments and parts of dental apparatus which up to now had been nickel and chromium plated. As far as these instruments were made of steel, a silver plate has been applied before the palladium.

CHAIRMAN CALDWELL Thank you for giving us that information. Are your questions answered properly? Do you wish any further answer on that?

DR. SCHUMPELT: No, I don't want any. I just wanted to bring palladium to the general attention as a metal still available without restrictions.

CHAIRMAN CALDWELL: Are there any further questions you would like to ask these gentlemen? Mr. Hogaboom, do you have something to add to this discussion?

MR. GEORGE B. HOGABOOM (War Production Board, Washington, D.C.): Mr. Anderson spoke about a new development—chromium plating on silver. I am pleased to report

that such a process is now perfected and the plating is being done on a commercial basis.

The method of operation was developed at the research laboratory of Underwood Elliott Fisher, under the direction of R. M. Woodward and John G. Poor.

I have seen the process in operation and have had some surgical instruments made of steel silver plated, buffed, and chromium plated. The silver is deposited directly on the steel and after the silver is buffed, the chromium is plated on it without any undercoat, that is, directly on the silver.

The final finish is identical in appearance to that of a nickel-chromium coating.

The salt spray life is equal to the nickel-chromium coatings when the two deposits are of the same thickness.

This process opens up a new field and will assist materially in the conservation of nickel which is one of the most strategic metals in production of war goods.

The Underwood Elliott Fisher Company and their research staff is to be congratulated upon developing the process and also especially for their offering this process to the government for the production of such important products as surgical instruments.

U. S. STONEWARE ACQUIRES PROMINENT MECHANICAL RUBBER GOODS PLANT

The Chamberlain Engineering, Ltd., a unit of the United States Stoneware Co. has just purchased the business and mechanical rubber goods factory of the Lower Rubber Mfg. Co. at Ravenna, Ohio. The plant was built in 1938 and its equipment therefore, is thoroughly modern.

This new Lower Plant will be used principally for milling, calendering, extruding and molding operations on the "TYGON" series of synthetic rubber-like materials. Provision will also be made for the production of U. S. Stoneware's "DURALON",—the synthetic resin with a polymerized furfural orthosilicate base,—as a substitute for hard rubber in all extruded and molded shapes.

The old and varied mechanical rubber goods line of the former Lower Company will be retained. Many new rubber items will also be produced for the Chemical Warfare Service and other war agencies.

The technical facilities and sales organizations of the two companies will be merged. Mr. M. S. Lower, former President of the Lower Rubber Mfg. Co., will serve as General Manager of the plant, which will be operated as the Lower Rubber Mfg. Division.

HERE AND THERE

Our thanks are extended to Mr. William Starr, Lea Manufacturing Company, Waterbury, who has so kindly written articles on priorities, etc., and whose final article appeared in the May issue. We appreciate Mr. Starr's efforts very much, and have plenty of assurance that his articles have been of great benefit to our readers.

NEWS ITEM

ADDITION AGENTS for chromium baths, manufactured by ZIALITE Corporation of Worcester, Mass., are being used by an increasing number of Hard Chrome platers doing War work, because of the finer grained, denser and harder deposit secured from such baths as compared with ordinary baths. Baths made with these ADDITION AGENTS a'so have greater throwing power than the usual baths.

The company upon request, is sending small samples of steel which have been plated at 135°F. and 430 amperes per square foot for exactly the same length of time. One sample was plated in the ordinary chromium bath and the other in a bath with the ADDITION AGENTS.

When the chrome is stripped from these samples with hydrochloric acid, it takes from five to ten times as long to strip the sample plated with ADDITION AGENTS, proving clearly the denser, finer grained structure of the deposit.

ZIALITE CORPORATION,
A. M. Wilson.

Zapon Division, Atlas Powder Company, recently perfected for the Army, a new straight phenol formaldehyde finish, to coat the interior lining of the new steel shell cases which are now authorized by the Government to conserve critical brass. Known as S-198-C in the Zapon series, the new Zapon finish protects the inside walls of the new type shell cases against conditions of use or corrosion caused by the action of powder, rust or other agents. Zapon laboratories worked with the Army from the inception of the project and the company is gratified that this finish more than fulfilled the rigid military requirements. Only a formulation of the most exacting standards will meet the exacting specifications required. The motto before all concerned in this project was "there must be no duds here" . . . here being the few square feet behind the gun in action, somewhere on the battlefield.

Research Committee

It was announced in the June Column that Mr. Lux has resigned and the Research Committee would obtain the services of a new Research Associate.

At this time the Research Committee would like to receive applications from any one interested in working under the supervision of the Research Committee and the direction of Dr. Wm. Blum at the Bureau of Standards. Every one who is familiar with the work of the Research Committee will realize that it is an excellent opportunity for a man to work at the Bureau of Standards and particularly to work under the direct supervision of Dr. Blum. Men who have worked on the various problems in previous years have received training which was very helpful to them when they got into industry.

The Committee requires a man who understands research methods and who has ingenuity and resourcefulness enough to contribute to the problem as well as keep the details progressing smoothly. It also requires a man who can read reports at the Annual Meetings of the American Electroplaters' Society and meet with the Executives who call at the bureau of Standards to discuss the progress of the work.

The Research Committee will be glad to receive the application of anyone interested in this position and all applications should be sent to Mr. Thomas F. Slattery, c/o Bureau of Engraving & Printing, Washington, D.C. The application should include all facts of the applicant's training and education and any other facts which may help the Committee in selecting the proper man. It should also include a small photograph of the applicant.

Treasury Department
Bureau of Engraving And Printing
Washington, D. C.

Gerald Lux, Research Associate, has decided to resign to accept another position and that the Research Committee would be pleased to receive applications from persons who feel that they would be interested in the position.

It is desirable that applicants state their familiarity with electroplating and its fundamental electrochemical principles, their age, education, experience, references and the lowest acceptable salary consideration.

Applications must be received immediately by T. F. Slattery, Bureau of Engraving and Printing, Washington, D. C.

Business and Social News

BRANCH NEWS

Educational Activities

AMERICAN ELECTROPLATERS' SOCIETY

Lancaster Branch of the A.E.S. met this evening at the Old Mill Hotel, Lincoln Highway West, at 8:30 o'clock. The newly elected chairman and other officers presided. There were 14 in attendance. The secretary reported that we had 43 members at the last quarterly report and the finances of the branch were in good condition.

The secretary informed the branch that the sec etary, librarian and chairman of the Social Committee had decided they would fill their positions without the branch paying their yearly dues.

The Chairman announced that there would be no picnic held this year and appointed the following committees.

Membership: H. L. Hovis, Chairman; Charles Snyder, R. L Hoenstine, and D. Fleming.

Social Committee: Charles Bowers, Chairman.

Librarian: Harold Kilheffer.

Mr. Leroy Critchfield, our member and delegate to the convention gave his report. Mr. Critchfield reported that the Amendment to the Constitution, to change the name of the Society was defeated 46-41. Our delegate voted yes because the general sentiment was to increase the scope of the society. He also reported the decision was made to continue on the rolls, without payment of dues, all members of the society called into the service of the government, where the local branch so desires.

Mr. Critchfield then gave a resume and review of the papers presented at the sessions which he attended. From the highlights which Mr. Critchfield presented it is evident that the annual publication will be filled with information of great importance at this time. After Mr. Critchfields' report a buffet luncheon was served.

WILLIAM H. FORDNEY, *Secy.*

Cincinnati Branch regular meeting was held at the Hotel Alms, Thursday June 25. Meeting was opened by, Harry Miesner. Frank Nordman installed officers.

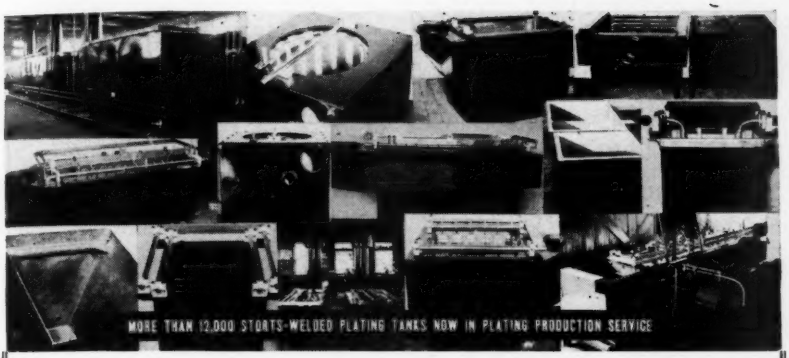
A report on the Convention was given and quite a discussion was held on accepting Finishing men as members which all seemed to favor.

The Cincinnati Branch opened the coming year with a bang getting five new members which we hope is just a start. One member being Mr. Mechley, who is the second generation to be a member of Cincinnati Branch, the others, Louis Ragne, Albert Thomas Carnes, Fred Williamson, and H. E. Hargy who gave an invitation to the members to visit his plant to see how Buffs were made; and later a party at his home the date which is to be announced.

A short talk by Past President Knoepler whereon the Branch thanked him for his 6 years of faithful service.

Mr. Miesner announced the donations of prizes to be given by The Cincinnati Plating Co. and Max Wocher Co. for the members getting the most applications for members. I hope this is just a start for us and all Branches as we need members and they need the A.E.S. now more than ever due to changes due to the war.

AL FOREMAN, *Secy.*



AROUND-THE-CLOCK WORKERS

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Philadelphia Branch meeting was opened by President Verrell. All officers being present except the 2nd Vice-President, Del Robson, and Joe Underwood of the Board of Managers.

Librarian Henry Orlik had a surprise for us; introducing Charles Cahn and Dr. Engel of the Colonial Alloys Co.

Mr. Cahn gave an interesting lecture and demonstration on the plating of Aluminum, with actual samples of the plating which were completed in a job shop before the audience.

Dr. Engel's lecture and demonstration of a new type solution for Anodizing Aluminum was well received. A low cost transformer of A. C. current was used in the demonstration. A lively discussion occurred during both lectures and both demonstrations.

Dr. Engel and Mr. Cahn received a rising vote of thanks and also an invitation for a return lecture and demonstration in the fall.

John S. Jasin was elected an active member of the Society after approval by the Board of Managers.

After a motion was made for approval of the bills, the Branch adjourned for the Summer at 11.00 P.M.

PAUL MENTZER, *Secy.*

Toronto Branch held its meeting in the Royal York Hotel on June 12th. President Boaz was in the chair. The attendance was fair, considering it being our last meeting until September 11th.

Mr. Kemish read the Auditors report which was received with thanks to the trustees. Allan Byers then read his report of the Grand Rapids Convention; he apparently didn't miss much of it. Allan received a hearty vote of thanks from the members.

John Acheson then spoke on the joint meeting with the Rochester, Buffalo, and Toronto Branches which are to meet at Niagara Falls sometime in October. Mr. Acheson also spoke on the high-lights of the past convention.

President Tom Boaz closed the meeting at 11:00 P.M.

JAMES S. CAIRNS, *Secy.*

Cincinnati Branch meeting was held at the Hotel Alms, as Vice President, I conducted the meeting, as Mr. Knoepler was unable to attend. Both the attendance and refreshments were good.

Harry Miesner was elected President; William Stoddard elected Vice President; Joseph Adler elected Treas-

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*See article in June MONTHLY REVIEW page 493.

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urer; Wm. Ehlen, Librarian; and Al. Foreman, Secretary.

Harry Miesner gave a talk on what he would like to do next year by giving every member some kind of job, or committee to be on. I am sure Cincinnati shall be heard from quite a bit as Harry is a very hard worker—all he needs is a little help.

AL FOREMAN, *Secy.*

Los Angeles Branch meeting was opened by President E. R. Holman. Minutes of the May meeting were read and approved. Bills were ordered paid. Mr. Lamoureux read a letter from E. T. Candee of the research dept. thanking the Branch for donation of $50.00 also explaining in detail how this money is used.

The Branch accepted a letter drafted by Mr. Lamoureux to be mailed to firms that we think might be interested in research and would like the opportunity to contribute to this cause.

Mr. Erwin Frauenhoff was appointed chairman of picnic committee which is to be held July 26th. Place to be announced later. He appointed E. W. Wells, Stanley Rynkoff, John Merigold, C. C. McLaren and E. R. Holman to assist him. Because of the noise and etc. it was suggested that during our two months vacation that we try and find another place for our meetings. Mr. Lamoureux, Mr. Frauenhoff and Mr. E. W. Wells were appointed to this task.

Mr. ApRoberts, our librarian, presented several motion pictures titled, "Safeguarding Military Information and Subcontracting"; also a very interesting talk on "Cadmium vs. Zinc Plating" which caused quite a lot of discussion. Meeting adjourned. The next meeting will be held on Sept. 9, 1942.

C. C. MCLAREN, *Secy.*

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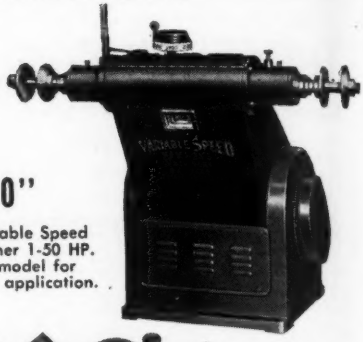

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Newark Branch regular meeting was held on Friday evening, June 5, 1942, at the Hotel Robert Treat, Newark, N. J. The meeting was called to order at 8:30 P.M. with President William Bruhns presiding. All other officers and 29 members attended this meeting.

The minutes of the previous meeting were read and approved.

A communication from President Candee was read and placed on file.

Under Committee reports, Mr. Smith reported that a farewell party had been held for George Reuter who was leaving for St. Louis. Mr. Oldam reported that the Photographic Display representing Newark Branch had been shipped to Grand Rapids.

Under Unfinished Business, a communication from Mr. Albert Hirsch of the Philadelphia Branch, which was held over from our previous meeting, was discussed and the results not being favorable to the questions were reported to the writer.

Mr. George C. Arnold and Mr. F. Erlenmeyer were reinstated.

A resignation from Mr. Adolph Bialecki was accepted.

Mr. Conrad Corda and Mr. Joseph P. Mickiewicz were suspended for non-payment of dues.

Under New Business, it was decided to hold only one meeting during July and August, on the third Friday of each month.

Mr. William T. Maguire, our New Librarian, conducted an informal Question Box which lasted about a half hour.

Meeting adjourned 11 P. M.

GEORGE WAGNER, *Secy.*

Toledo Branch held its regular monthly meeting on the evening of June the 4th, in the office of Mr. Spanolis with twelve members and four officers present. The meeting started at 9:00 o'clock and was presided over by the President, Mr. Vanorsdall. Minutes of the previous meeting were approved as read.

After some discussion on Glasstone's articles in the REVIEW formal action was tabled until the next regular meeting, due to the fact that there were too few members present to get a representative opinion of the Branch. An attempt was made to make plans for the educational program for the fiscal year; subjects members would like to hear discussed, speakers, etc. Silver and Hard Chrome seemed to be the most popular with the members present, as well as talks on defense work. Some members requested to have Mr. Ernest Lyons on our speaking program in the near future. Again final action was delayed due to the small percentage of members present.

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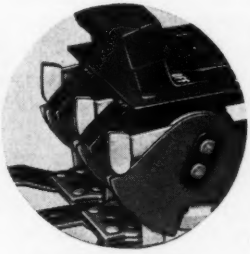
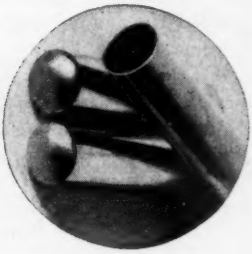


SEYMOUR PHOSPHOR BRONZE



SEYMOUR BRASS

THESE ALSO FIGHT

BEHIND our soldiers at the front, a second army of men and women work long hours at lathes and presses at home. It is our happy privilege to help keep these workers supplied with the heavy tonnage they need; but always we want to accompany Seymour Products with engineering service if it will lick a fabrication problem. For this, we have technicians and equipment to make metallurgical tests, studies and analyses.

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SEYMOUR

NON-FERROUS ALLOYS

THE SEYMOUR MFG. CO., SEYMOUR, CONN.

About one hour was taken up in the discussion of silver, copper, hard chrome, tin plating, and defense work in general.

It was decided to discontinue the meetings for the summer; the next regular meeting is to be held September 10, in room 224 of the Macomber High School on Monroe St. Meeting adjourned at 10:30 P.M.

G. P. H. BERGEMAN, *Secy.*

Pittsburgh Branch last regular meeting was held Thursday, May 7th, at the University Club. The next meeting will be held early in September, probably September 3rd.

The following officers were elected for the ensuing year: President, Mr. S. E. Hedden; Vice-President, Mr. Herbert Saylor; Sec'y.-Treas., Mr. Frank R. Keller, Board of Directors, Mr. G. A. Jersey; Mr. James Conolly, and Mr. Richard Smith; Librarian, Mr. Richard Dimon.

Our May 7th meeting was a social affair to which we invited the ladies. A colored, talking picture "Steel-Man's Servant" was presented by the Carnegie Illinois Steel Company. Several violin solos were presented by one of our members, Mr. Saylor. A string quartet gave several very fine selections to conclude the evenings entertainment. The meeting closed with a buffet supper of sandwiches, cake and coffee.

FRANK R. KELLER, *Secy.*

Chicago Branch

The following questions were found in the question Box.

1. *What causes parts to have a red oxide deposit when they come out of a hot black dip. Heat 295 to 305°?*

Ans. Several suggestions offered, such as adding a small amount of Chrome acid, too much iron, as the heat evaporates the water the solution becomes too concentrated.

2. *How can zinc that has been soldered be cleaned?*

Ans. Use mild and neutral cleaners.

3. What distance apart should 1 in. diameter steel rods be when plating in acid copper solution; also distance from anode to cathode?

Ans. One to 1½-in., apart and about 12 in. from anode to cathode.

J. W. HANLON, *Secy.*

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THE QUESTION BOX

Boston Branch Questions and Answers on Hard Chrome Plating.

1. *Will the chromic acid etch before plating cause a smut on high carbon steel?*

Ans. No, an oxide may be formed on the surface but not a smut. The etch gives a good basis for an adherent chromium plate. A smut may be encountered if a sulfuric acid etch is used.

2. *What kind of steel is used in molds for plastics?*

Ans. All kinds of steel are used and successfully plated.

3. *What is the strength of the muriatic dip used in preparing work for hard chromium plating?*

Ans. 40% muriatic acid by volume is used for this dip. It is used at room temperature with a wetting agent, and under these conditions does not cause smut on steel.

4. *What is the strength of the chromic acid etching solution?*

Ans. It was found that 28 oz. 1 gal. of chromic acid gave the best results. Any lower concentration showed up the action and a higher concentration showed no particular improvement. No sulfate is needed in this etch.

5. *How small a hole can be chromium plated?*

Ans. A ten thousandths inch hole, one inch deep has been plated successfully.

6. *After ten minutes in the Cr O3 etch will any smut be formed?*

Ans. None should be formed on high or low carbon steel.

7. *In plating chromium inside small openings, is an agitator needed to continually force fresh solution into the holes?*

Ans. No the gassing caused by plating will give enough circulation.

8. *What causes burning in chrome plating?*

Ans. Too much current, work too close to anodes, too low a temperature, or in general, improper handling.

9. *How far away from a sharp edge should a thief be fastened?*

Ans. Usually about a sixteenth of an inch will be found suitable. Steel wire should be used because of its greater electrical resistance. Care should be taken to have the wire clean.

10. *How can auxiliary anodes be made for work having slots very close together?*

Ans. Sometimes difficult work of this type can be handled easier by plating every other slot, then moving the anode over and plating the remaining slots in a second operation.

11. *What stop offs are used and will stop off withstand hot alkaline cleaning?*

Ans. There are a good many stop-off lacquers on the market, sold by such companies as United Chromium, Michigan Chrome, Maas & Waldstein, etc. The bulk of the cleaning is done before the stop-off lacquer is applied and the lacquers will withstand the final cleaning operations with no difficulty.

12. *How much wetting agent is used in the muriatic dip?*

Ans. A widely advertised acid addition agent is used, one pint to 100 gals. of acid.

13. *Is cast iron a satisfactory base for hard chromium?*

Ans. Cast iron can be plated suc-

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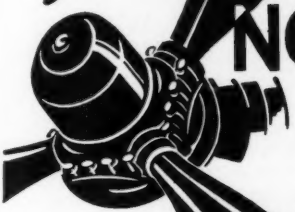

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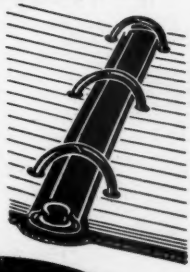

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cessfully but does require different handling from steel. The etch is important, the current density is much higher and the cleaning cycle often has to be altered radically. One job made from low graded cast iron all cleaning was eliminated except degreasing and rubbing down with aluminum oxide. Good results were obtained.

14. *What buffing compound is used for finishing the chromium?*

Ans. A fine black emery flour compound has been found very satisfactory. L. GAGNON, *Librarian.*

Indianapolis Branch

A QUESTION & ANSWER program was held during which the following questions were answered:

1. *What is a bond test for testing adherence of the plate?*

Ans. by Monagle. Bend piece at right angles and observe adherence.

Ans. by Binai. Heat plate to observe blistering of the plate.

2. *Is there any practical method of removing carbonate from cyanide copper?*

Ans. by Binai. Use calcium hydroxide or barium hydroxide.

5. *Why does the lead lining in a chrome tank warp and curl when not protected by glass?*

Ans. It is not bonded to the steel tank.

4. *What is the relative porosity of nickel and copper up to* 0.0001 *in?*

Ans. Nickel is less porous than acid copper, which is less porous than cyanide copper.

5. *Will iron or lead plate out of cyanide copper or acid copper solution?*

Ans. Lead will plate out of cyanide copper, iron out of acid copper.

6. *What is the best silver polish to use to prevent tarnish?*

Ans. Baking soda.

7. *Is there a way to remove hydrogen embrittlement other than heat treating below* 350-375 *degrees F?*

Ans. by Binai. Put in boiling water for 1 hour.

8. *What is a good bright dip for tin?*

Ans. by Binai. Put the work in hot palm oil or Crisco at 230 degrees C. The plate melts and flows a little giving a bright surface.

9. *When current of rectifier source is broken in silver plating operation, how much of a time interval will elapse before the current stops?*

This question was held over.

10. *What thickness of copper plate to protect steel during carburizing?*

Ans. 0.0003-0.0005 in. of copper.

11. *What is the required temperature and current needed to run a black nickel solution?*

Ans. by Binai. Use either single or double salts and under 1 volt (0.7 volt) in still tank. The sulfocyanate and zinc ratio is most important.

12. *How can zinc plating be protected from pickling acid?*

Ans. By rubber covering of proper sort.

17. *Is it good practice to copper plate under cadmium?*

Ans. Cadmium direct on steel is better. Cadmium will be absorbed in the copper.

14. *What stop-off will stand up best in cyanide copper?*

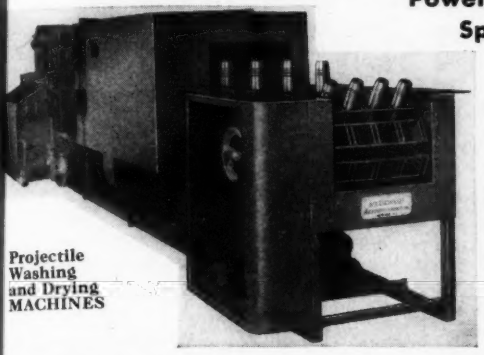
Ans. Pure gum vulcanized rubber or Waxkote.

15. *What metals are not on priority?*

Ans. Gold and silver.

EZRA A. BLOUNT, *Secy.*

Short Cuts to Operating Costs



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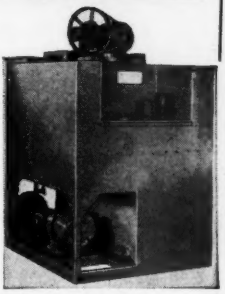

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Philadelphia Question Box

President Verelle turned the meeting over to the newly installed Librarian Henry Orlik, who conducted the following question box—

1. *Name a good finish to replace nickel?*

Ans. Bright Zinc, should be lacquered. Silver, Bbl. plate, 2 oz./gal. Silver, 8 oz./gal. Free Cyanide, then Lacquer. Lead, too dull.

2. What is the best way to plate Nickel on old Nickel?

Ans. Polish, soak in 8 oz./gal. Cyanide bath for ½ hour, 100% Muriatic then Nickel plate; except steel. Strike in Sulphuric strip and plate.

3. *What is the best way to Bbl. Nickel, then Chrome plate Stainless steel?*

Ans. 50% Muriatic dip for undetermined time, then very dilute Muriatic rinse and plate.

4. *How to Chrome plate Stainless steel direct?*

Ans. Anodic clean in 10% Muriatic dip, rinse, and plate.

5. *Best way to plate on plastics?*

Ans. See *Metal Finishing* 3 or 4 months ago.

6. *What is the best way to keep Carbonates out of Bbl. Cadmium?*

Ans. None. Remove by freezing or precipitate with Calcium Sulfate.

7. *Rochelle Salts in Cadmium Solution?*

Ans. No experience. Question referred to the Mastbaum School in care of Al. Hirsch.

8. *What causes anodes to appear to become soft in Nickel Bath?*

Ans. Too high Nickel Chloride content.

9. *Indium on Copper, Brass, and Steel?*

Ans. Indium should be fused with the under plate of Copper, Brass, or Silver by heat treating and immersed in oil, then becomes very hard.

President Verelle commented on the Librarian's able handling of the Question Box.

1. *How do you do Arsenic plating?*

Ans. 1½ oz./gal. White Arsenic, 1½ oz./gal. Sodium Hydroxide, 1/15 oz./gal. Copper Cyanide, 1/30 oz./gal. Zinc Cyanide. Use brass anodes. Room temperature. 6 volts (4 volts at tank). On copper plated articles. Lacquered afterwards.

2. *What is Black Chromium plating?*

Ans. 53 oz./gal. Chromic Acid, .53 oz./gal. Acetic Acid, 100 a/sf.

3. *How, reduce 6 volt circuit for Black Nickel?*

Ans. Lamp bank, in parallel, to reduce voltage. Nichrome wire in first stage of rheostat.

4. *Formula for removing scale from stainless steel forgings?*

Ans. Bullard-Dunn process. Sulfuric pickle with reverse current. Sand blast. Muriatic pickle with reverse current.

5. *How would Aluminum be oxidized black?*

Ans. Anodize—Sulfuric process and dye black. Hydrochloric Acid and Zinc Sulfate.

6. *How plate sheet Aluminum—such as 52-s, 52-s?*

Change Nickel Sulfate solution pH to 7.6; scrub with Pumice and Ammonium Hydroxide, then plate.

7. *What effect carbonized quenching oil on zinc plating?*

Ans. Clean, pickle, and ball burnish; then plate.

8. *How deposit Silver faster than with regular solution?*

Ans. Use Mesle method.

9. *How to keep Black Nickel coming black?*

Ans. Analyze and make necessary additions.

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Please mention THE MONTHLY REVIEW *when writing*

10. *Does distilled water pass electric current?*

Ans. No.

11. *How plate black on steel and brass, without polishing or brushing afterwards?*

Ans. Black Nickel on steel. Iron, Zinc, and Phosphoric acid on brass.

12. *How Silver plate on stainless steel?*

Ans. 25% Hydrochloric pickle, then Silver plate without strike.

PAUL MENTZER, *Secy.*

Detroit Branch

1. *What is the minimum copper thickness required for selective carburizing? How is this influenced by the initial finish of the steel?*

Ans. The thickness may vary from .001″ to .003″, depending on methods of carburizing, thickness of case desired, porosity of late, and roughness of surface of article being carburized. Rough steels require considerably more plate than smooth machined surfaces. In cases where the part is of great value, it may be well to go considerably above .003″ to preclude possibility of hard spots.

2. *Would the practice of running a tin bath 24 hours a day have any detrimental effect on the solution?*

Ans. With proper control this is entirely possible. In fact, from the standpoint of the anodes this practice would be ideal. This is gone into in considerable detail by Frederick Bauch in 1940 proceedings of the A.E.S. Reading this paper is recommended to anyone having further interest in this subject.

3. *Where is the tin coming from for the tremendous expansion in strip tin plating?*

Ans. Less than 1% is coming from detinning of cans. The rest will come from Bolivia, our own small sources of tin, and from the national stock pile. However, it must be borne in mind that the reason for strip plating instead of tin dipping is that a saving of 60% to 70% is effected. Consequently we will be using less tin rather than more. Added to this is the saving of tin effected by substitution of plastic containers, paper cans, and plastic lined iron cans for tin cans.

4. *What is a successful method of lining acid pickling tanks now that rubber and lead are scarce?*

Ans. One can use steel tanks lined with acid proof brick. The steel should first be coated with asphalt. A steel tank lined with a plastic known as Plastoline can be used. Steel tanks lined with Carbate brick and cement are quite widely used. They stand a rather wider variety of acids than some of the others. Finally, we must not forget our old favorite, the heavy wood tank, put together with acid resisting bolts and fasteners. Carbate coils can be used to heat a variety of acids. While rather fragile they are claimed by some to be even better heat conductors than metals. High silicon irons and pyrex glass can also be used for certain conditions.

EDGAR A. HAHN, *Librarian.*

PLATING CONVEYOR BULLETIN

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Bulletin SA-101 of the Hanson-Van Winkle-Munning Co., Matawan, N. J. giving illustrations and detailed descriptions of the construction and the improved features in this class of equipment. The bulletin describes the various types of drives, a wide range of heavy duty carriers, methods of agitation of "motion plating" and ventilation; also the operation of these machines in combination with full automatics. The Bulletin is profusely illustrated throughout.

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THE QUAKER CITY PLATERS' REMINDER
THE QUESTION BOX

1. *What is a good finish to replace nickel?*

Ans. Bright Zinc and Lacquer. For a dull finish lead plate. Many articles are silver plated in a barrel with the following solution: 2-oz./gal. silver, 8-oz./gal. free cyanide.

2. *What is the best way to nickel plate over old nickel plate?*

Ans. It is not good practice to plate on previously plated articles without removing the old deposit.

3. *How can stainless steel be nickel plated in a barrel?*

Ans. Prepare the surface of the stainless steel in the usual way, clean, pickle in 50% hydrochloric acid and rinse in a very dilute hydrochloric acid pickle, rinse and plate. After it has been nickel plated it is an easy matter to chromium plate it.

4. *How can stainless steel be chromium plated?*

Ans. Prepare the surface in the usual way. Anodic pickle in a 10% solution of hydrochloric acid, rinse, and plate.

5. *What is the best way to keep carbonates out of a barrel of cadmium plating solution?*

Ans. Carbonates build up in any cadmium plating solution and therefore cannot be kept out. Carbonates can be removed from the bath by freezing out, or can be precipitated out with calcium sulfate.

6. *Why is not rochelle salts used as an addition agent in a cadmium plating bath?*

Ans. Rochelle salts would most likely not serve a good purpose in a cadmium bath because cadmium baths have a high cathode and anode efficiency and a good throwing power. Addition agents are added to any solution to improve some otherwise bad condition. Addition agents have been added to cadmium baths to brighten the deposit. So far, bright dips have been found best for brightening the deposit. — Henry Orlik

PRESIDENT'S LETTER

An award has been established for the members of Philadelphia Branch, A.E.S. to be known as "The Al. Hirsh Award".

The award is an engraved gold plated bronze medal for the best practical paper presented and read at any Philadelphia Branch Meeting during any one year.

The award to be made at our yearly meeting and banquet. Judges to be the Board of Managers, who are in office during the year of presentation of paper.

The first award to be made at our yearly meeting 1942, provided a paper has been presented between this date and then.

You will please give this proposal your careful consideration and I trust your approval. Will some member, then, start and prepare a paper. Always be mindful that the paper telling what is doing in one's own way of writing is the most interesting paper to practical men of like experience. Write your intentions to the secretary now. —Nat Verrelle.

First Annual Photographic Exhibition
1942 NATIONAL CONVENTION OF THE A.E.S.
June 8th to 10th—Hotel Pantlind
Grand Rapids, Michigan

Manufacturers Photographs of Equipment and Processes

1st.—Hanson-Van Winkle-Munning Co.—Modern low voltage generator under construction.

2nd.—The Metalcraft Co., Cincinnati, Ohio (photo by Harry Misner) Polishing Department.

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3rd.—The Max Wocher & Son Co., Cincinnati, Ohio—Assembling Microscopes; and the Mont R. Reid Operating Table.

Plated Parts

1st.—Hanson-Van Winkle-Munning Co.—Modern hot galvanizing coat adhesion.
2nd.—(same company) Another aspect of the adhesion.
3rd.—(same company) Semi-automatic nickel conveyor.

People and Activities

1st.—Schumpelt: Child and dog sequence.
2nd.—Charles Macauley: Stairway Ballet.
3rd.—Robie Macauley: Peter Taylor.

Landscapes, Outdoors

1st.—K. Schumpelt: Fat and Skinny.
2nd.—W. L. Cassell: All's Quiet.
3rd.—W. L. Cassell: Perfection.
Honorable Mention. Charles Dutchess: Home Town Atmosphere. W. L. Cassell: Cool Waters.

Hobbies and Tabletops

1st.—C. Macauley: Watch.
2nd.—C. Macauley: Mephisto.
3rd.—C. Macauley: Bel Paese.

Still Life

1st.—C. M. Douglas: Due to Be Cleaned.
2nd.—C. Macauley: Tradition.

Animals

1st.—Charles Macauley: Spring Turning.
2nd.—William E. Kerr: Expectancy.
3rd.—W. L. Cassell: OK Shoot.

Past Convention Pictures

1st.—C. M. Douglas: Off to An A.E.S. Meeting.
2nd.—7th A.E.S. Convention Photo.
3rd.—Newark Branch Display.
Honorable Mention:—Chas. O. Werft exhibit.

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WESTVACO CONSOLIDATES SUBSIDIARY COMPANIES

On July 1, the Sales and Technical services of Warner Chemical Company division, California Chemical Company division, the Magnesol Company division and the National Kellastone Company division will be integrated into Westvaco Chlorine Products Corporation. No changes in personnel or functions are involved in this move, company officials explained, the purpose of the integration being to render a better service to government and industrial consumers.

With this consolidation of activities, Westvaco chemical plants at Carteret, New Jersey, South Charleston, W. Va., and Newark, California will be more closely tied together. Westvaco's extensive magnesite mining operations at Luning, Nev., Gustine, Calif., Livermore, Calif., Patterson, Calif., Chula Vista, Calif., will also be integrated into closer contact with the Sales and Technical Service Division of the parent company.

Principal offices of Westvaco Chlorine Products Corporation will continue to be in the Chrysler Building, New York, where the company occupies two floors. Branch offices are located in Chicago, Greenville, S. C., and Newark, California. Officers are William B. Thom, President, Max Y. Seaton, Executive Vice-President and Technical Director, Louis Neuberg, Vice-President, Sales, and Maurice Gilbert, Secretary and Treasurer. W. N. Williams is in charge of Westvaco production while J. Rivers Adams is Sales Manager.

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Copper Sulphate
Cyanide Copper
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Cadmium
High Speed Copper
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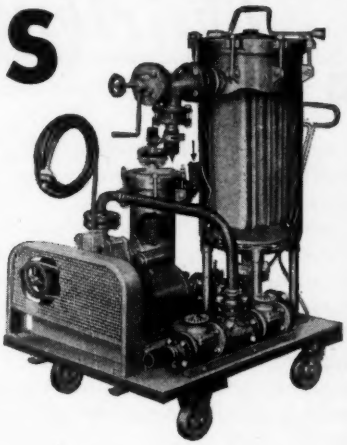
And Others



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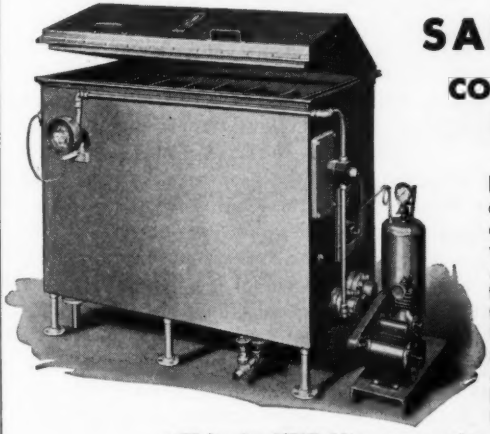

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The Abstract Section

GEORGE WAGNER, *Chairman, Program and Educational Committee*

Acid Copper Electroplating and Electroforming. By J. HOMER WINKLER. *Trans. Electrochemical Society* **80** (Preprint 28) (1941). Acid copper solutions were among the earliest plating baths. Compared to the cyanide bath, the acid copper bath excels in ease and simplicity of operation and maintenance, high cathode efficiency (based, however, on bivalent copper instead of univalent as in the cyanide bath—E.H.L. Jr.), and high limiting current density (as high as 3000 amp./ sq. ft. under certain conditions); on the other hand, acid baths cannot be used to deposit copper directly on iron, steel, or zinc, without a preliminary flash deposit from a cyanide bath, deposits of more than 0.001" on stationary cathodes require polishing, and the cleansing action of the copper cyanide bath is missing from the acid bath. The recommended bath is:

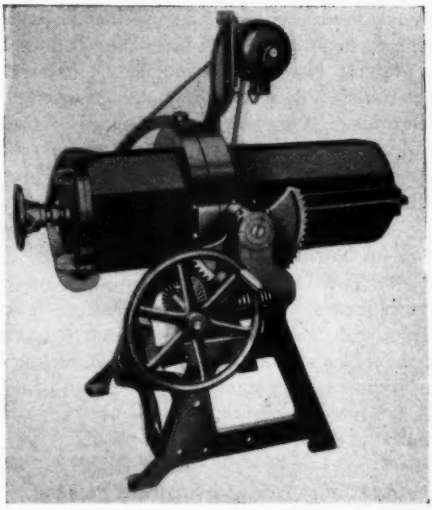
		Limits
Copper sulfate (crystal)	24 oz./gal.	20-33 oz./gal.
Sulfuric acid	6 oz./gal.	6-13 oz./gal.
Temperature		70-122° F.
Current density		28-56 amp./sq. ft.

The functions of the bath constituents are described. 0.13 oz./gal. phenol sulfonic acid or 0.0004 oz./gal. glue are sometimes used as addition agents; operating details are given. To produce a softer deposit; increase the copper sulfate concentration, decrease the sulfuric acid concentration, decrease the current density or increase the temperature, or use addition agents such as dextrin. Solutions should be protected from dust and should be filtered periodically; agitated solutions should be filtered continuously. When only copper anodes are used, the copper content of the bath increases because some copper dissolves as cuprous ion, giving an apparent anode efficiency, figured on cupric ion, exceeding 100%. The cuprous ion is oxidized by the air; portions of the bath must be discarded periodically. Or, if enough insoluble anodes are used to just maintain the copper content, the solution may be maintained by merely adding enough sulfuric acid to make up for drag out losses. Lead anodes are satisfactory for this purpose, but provision should be made for the accompanying acid spray. The sulfuric acid content is determined by titrating with standard sodium hydroxide With methyl orange as indicator; then, by determining the specific gravity (a hydrometer is satisfactory), the copper sulfate content may be found from a table which is given. The solution is quite corrosive; tanks should be of lead- or asphalt-lined wood, rubber-lined steel, or glazed stoneware. Rolled or cast copper anodes are recommended, and electrolytic cathode copper is also promising The anode area should approximately equal the cathode area. The acid copper bath is extensively used for electroforming, details of which are given; these are of interest for the electroplating of plastics. Non-metallic molds are given a conductive coating of graphite, copper powder, or silver, after treatment, when necessary,

Lasalco Burnishing Barrels

V BELTS

MOTOR DRIVE



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to seal the pores. Metallic molds are usually made of a fusable alloy, as Wood's metal, which may be easily be melted out without injuring the electrodeposit; a coating of oil is generally applied from naphtha solution to facilitate separation from the mold. "Electrotyping is the largest commercial application of electroforming."

A recommended solution is:

Copper sulfate	33 oz./gal.
Sulfuric acid	10 oz./gal.
Temperature	100° F.
Current density	74-374 amp./sq. ft. (sometimes up to 462 amp./sq. ft.)
Agitation	Air

Electroforming is also important in making phonograph records; the process is outlined as follows: 1. Original recording (wax or plastic) (positive) → 2. Master mold (copper electrodeposited on original recording) (negative) → 3. Metal records (electrodeposited copper on master mold) (positive) → 4. Metal stampers (electrodeposited nickel face, then copper on metal records) (negative) → 5. Playing records (thermoplastic material stamped from metal records) (positive). The process is described in brief detail; and other applications of electroforming, such as master coin dies, copper plating thread, duplicate intaglio printing plates, metal powder, mirror reflectors, thin sheet copper, metal screen, and other dies, molds, and a number of additional products, are outlined. ERNEST H. LYONS, JR.

Chrome Plating for Surface Hardening. By ROBERT BILFINGER. *Oesterr. Chem.-. Z* **43,** 91-6 (1940). Electrodeposition of chromium can be used for decorative purposes or for surface hardening. The character of the deposit depends upon c.d., temperature, and electrolyte composition. The presence of small quantities of iron, aluminum, zinc, nickel, cadmium, cobalt, copper, vanadium, sodium, and potassium in the bath increases the hardness of the deposit. A five-fold increase in hardness has been obtained by deposition of a chromium layer 0.15 mm. (0.006 in.) thick.

H. STOERTZ. *Chemical Abstracts.*

Disposal of Waste Liquors from Chromium Plating. By R. HOOVER and J. W. MASSELLI. *Metal Ind.* (London) **38,** 273-6 (1941); *Chemical Abstracts* **35,** 4288 (1941). The waste liquors had the following composition:

Total Cr	87-643 parts per milllon
CrVI	75-636 " " "
Cu	0.2-34 " " "
Ni	trace to 6.4 " " "
Fe	0-80 " " "
SO_4	84-769 " " "
CN	0-22.4 " " "
Mineral acid	55-634 " " "

The CrVI is best reduced by Na_2S, BaS, scrap iron, or SO_2, after which a pure hydrated Cr_2O_3 can be precipitated with Na_2CO_3 or NaOH. Further details are given. ERNEST H. LYONS, JR.

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To July 1, 1942

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Cincinnati Branch

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